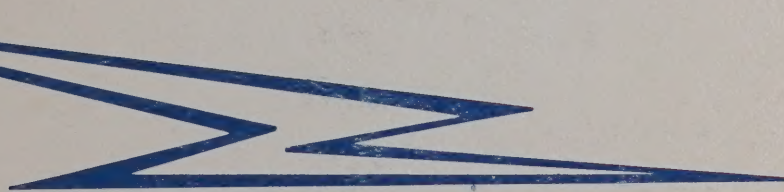




MORE PEOPLE BUY AND FLY CESSNA  
AIRPLANES THAN ANY OTHER MAKE

# 400 SERIES

**RNAV**  
(Type RN-478A)



# SERVICE/PARTS MANUAL

WORLD'S LARGEST PRODUCER OF GENERAL AVIATION AIRCRAFT SINCE 1956







# SERVICE MANUAL CHANGE NOTICE

SMCN #17

REFERENCE MANUAL NUMBER: D4564-13

DATE: May 14, 1976

MANUAL TITLE: 400 Series RNAV (Type RN-478A)

TO: All Zones and Dealers

FROM: CUSTOMER SERVICES DEPARTMENT

CORRECT YOUR SERVICE MANUAL AS SHOWN BELOW.

| SECTION<br>NUMBER | PAGE<br>NUMBER | PARAGRAPH<br>NUMBER | DESCRIPTION OF CHANGES                                                                                                                                                                                                                                                                          |
|-------------------|----------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2                 | 2-6            | Fig.2-3             | Center of figure; change the 0.75 REF distance between holes to 1.75 REF.<br><br>Bottom of figure; add the following information:<br>"Weight: RN-478A 4.4 lbs., Mounting 0.6 lbs., Total 5.0 lbs."                                                                                              |
| 4                 | 4-11           | Fig.4-2             | Left side of figure; third waveform from bottom should read as follows:<br>"ENR/APP RNAV VECTOR, TP5. IN PHASE WITH RNAV VECTOR. ENR MODE REDUCES AMPLITUDE TO $\frac{1}{4}$ OF APP."<br><br>Right side of figure; change the L/R + 1 GNN AMPLIFIER to read "L/R + 1 GAIN AMPLIFIER"            |
| 4                 | 4-17           | Fig.4-5             | Left side of figure; signal from the 2 to 1 MULTIPLEXER U8 should be changed from WORD 2 (SELECT WORD 1 = +5V) to WORD 2 (SELECT WORD 2 = +5V).<br><br>Lower left corner of figure; change Distance input to BEARING and Bearing input to DISTANCE. Change $399.9^{\circ}$ to $359.9^{\circ}$ . |
| 4                 | 4-23           | Fig.4-8             | Top of figure; signal from the RAMP GENERATOR should be changed from RAMP TPL to RAMP TP1.                                                                                                                                                                                                      |
| 5                 | 5-15           | 5-13                | Under Step 1.; change Monitor U26 pin 5... to read "Monitor U26 pin 2.....".                                                                                                                                                                                                                    |
| 6                 | 6-23           | Fig.6-5             | In Zone 128U; change waveform labeled 33A to read 33D.                                                                                                                                                                                                                                          |







## SERVICE/PARTS MANUAL

# 400 SERIES RNAV (Type RN-478A)

### NOTE

This manual contains recommended service information and illustrated parts list applicable to the Cessna 400 Series RNAV (Type 478A). This information is supplemented and kept current by Service Letters and Service News Letters published by Cessna Aircraft Company. Recommended replacement parts for your 400 Series RNAV are available from the Cessna Service Parts Center.

The information in this Service/Parts Manual does not profess to include all the details of design, production, or variations of equipment, or to cover all the possible contingencies which may arise during operation, installation, or maintenance. Should special problems arise or further information be desired, contact the Service Department of Cessna Aircraft Company.

**CESSNA AIRCRAFT COMPANY**

**WICHITA, KANSAS**

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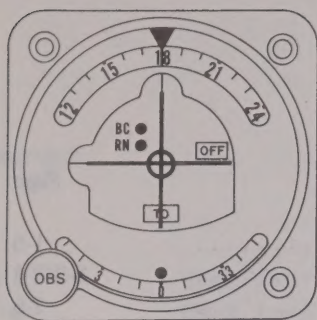
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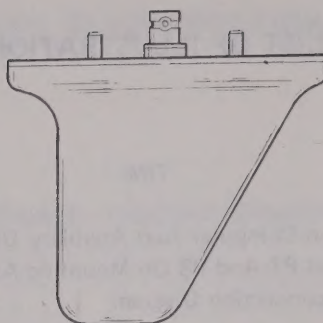
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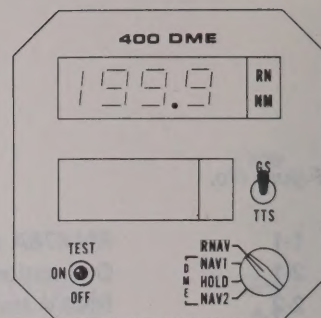




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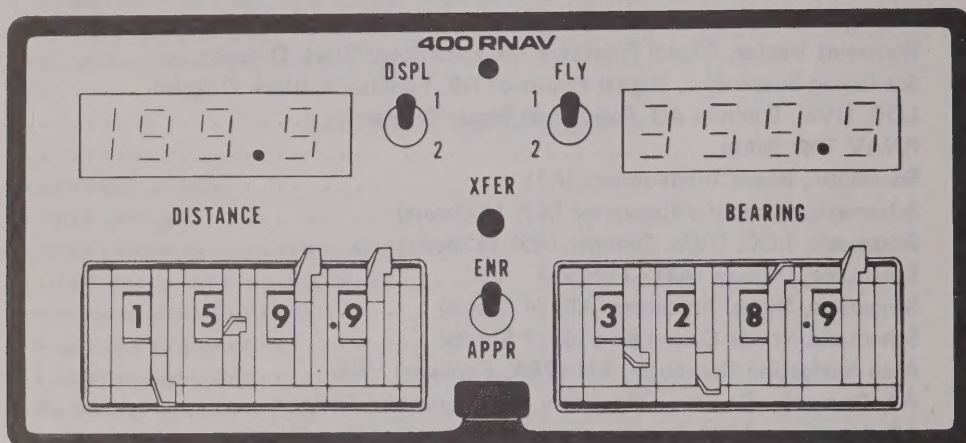


A-119A ANTENNA

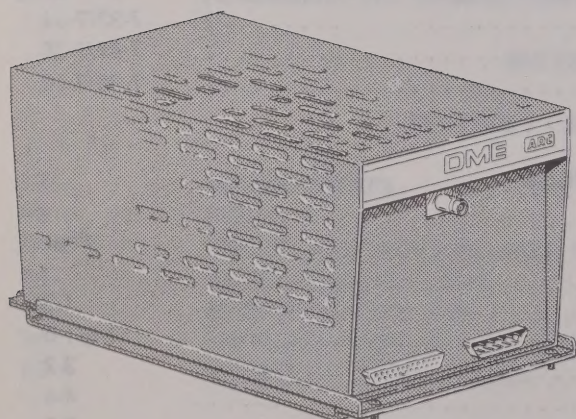


C-476A DME CONTROL

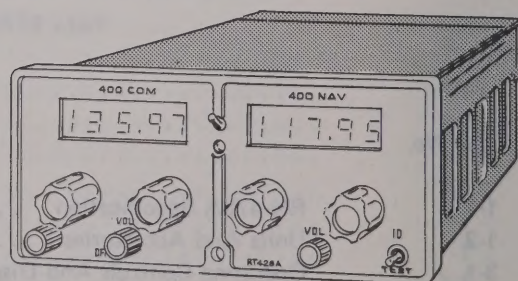
(IN-442AR or BR) (NOT SHOWN)  
 (IN-443AR or BR) (SHOWN)  
 (IN-41A) (NOT SHOWN)  
 (IN-41D) (NOT SHOWN)



RN-478A AREA NAVIGATION COMPUTER  
 (RNAV)



RTA-476A DME RECEIVER/TRANSMITTER



RT-428A NAVIGATION RECEIVER OR EQUIVALENT

0383-1-1

Figure 1-1. RN-478A Area Navigation Computer and Auxiliary Units



## SECTION 1

### GENERAL INFORMATION

#### 1-1. SCOPE.

This manual contains general information, installation, operation, troubleshooting, maintenance, and parts information for the RN-478A Area Navigation Computer (RNAV).

#### 1-2. GENERAL.

The RNAV is a panel-mounted, three waypoint computer which provides navigation data over a desired route from departure to destination. Distance measuring equipment (DME) and very high frequency omnirange (VOR) are the navigational aids employed by the RNAV. The outputs from the RNAV are applied to the DME control unit, as distance to the waypoint, and the course deviation indicator (CDI) as lateral steering data.

#### NOTE

RNAV has the capability of driving a horizontal situation indicator (HSI) and repeater instead of CDI(s).

Figure 1-1 depicts the RNAV control panel and the auxiliary equipment (typical) which comprise the RNAV system.

#### 1-3. SPECIFICATIONS.

Table 1-1 lists all the regulatory, functional, and electrical requirements for the RNAV.

#### 1-4. EQUIPMENT SUPPLIED.

Table 1-2 lists the units and accessories available for an

RNAV installation. The units and accessories supplied will depend on the requirements of the individual aircraft.

#### 1-5. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

VHF Navigation Receiver - The RNAV system requires a composite navigation signal from the output of a navigation receiver. The RN-478A is certified for IFR flight only when used with an RT-428A, RT-328T or R-41A.

Interconnecting Cables - Cables for the RNAV must be fabricated from individual wires (not supplied). The wire size required to fabricate the interconnecting cables are specified in Section 2, figure 2-2.

#### 1-6. TEST EQUIPMENT REQUIRED.

+28 V Power Supply - HP6291 (RNAV Power) or equiv.  
 +28 V Power Supply - HP6290A (RT-428A Power) or equiv.  
 +0—28 V Power Supply - HP6215A (RNAV Dimmer) or equiv.  
 Oscilloscope - HP140A or equiv.  
 DVM - Fluke 8600A or equiv.  
 NAV Test Set - IFR NAV 750 or equiv.  
 DME Test Set - IFR 1200Y3 or equiv.  
 DME - ARC RT-476A  
 DME Control - ARC C-476A  
 Indicator - ARC IN-44 ( ) ( ) R P/N 43910-0000 or equiv.  
 NAV Receiver - ARC RT-428A  
 DME Channeling Control Head - ARC C-109A  
 P/N 32460-0000 or equiv.  
 Four 12-inch Test Extender Cables - Fabricate locally from 16-pin dual-in-line sockets, connector plugs, and No. 26 AWG wire or from Extender Cable Kit, ARC P/N 61378.

TABLE 1-1. RN-478A SPECIFICATIONS

| Parameter                                                    | Specification and/or Range                                                                                                                                                                                                           |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Regulatory Compliance<br>RN-478A and Mounting P/N 44091-0000 | Meets the VFR and IFR requirements of FAA Advisory Circular AC90-45A, dated 2-21-75.<br>VOR/LOC converter portion:<br>TSO'd to C40a Environmental Category B-I.P.<br>TSO'd to C-36c Environmental Category /BD/AMAAAEXXXXX, Class C. |
| IN-44 ( ) ( ) R                                              | TSO'd to C40a Environmental Category B-I.P.<br>TSO'd to C-36c Environmental Category /BD/AMAAAEXXXXX, Class C.                                                                                                                       |
| General                                                      | Unit is completely solid state and makes extensive use of linear and digital integrated circuits.                                                                                                                                    |
| Functional Modes                                             | VOR/LOC/DME - conventional VOR—LOC converters with digital DME distance.<br>ENROUTE - Enroute area navigation<br>APPROACH - Approach and Terminal area navigation                                                                    |
| Size                                                         | RN-478A<br>Overall Height - 3.00 inches<br>Overall Length - 13.75 inches<br>Overall Width - 6.625 inches<br>IN-44 ( ) ( ) R<br>Standard 3" instrument                                                                                |
| Input for Waypoint Definition                                | Zero to 199.9 miles in .1 mile digital increments and zero to 359.9 degrees in .1 degree digital increments.                                                                                                                         |
| AREA NAVIGATION ENROUTE MODE                                 |                                                                                                                                                                                                                                      |
| Waypoint Computed Distance                                   | Digitally displayed zero to 199.9 nautical miles in unit miles and 0.1 mile increments on DME control head.                                                                                                                          |
| Course Width                                                 | $\pm 5.0$ nautical miles nominal per $\pm 150 \mu\text{a}$ current in a 1000 ohm load ( $\pm$ full scale in a standard deviation indicator).                                                                                         |
| Computed Waypoint Distance Accuracy                          | $\pm 0.3$ nautical miles $\pm 2\%$ of the distance.                                                                                                                                                                                  |
| Waypoint Bearing Accuracy                                    | The waypoint bearing tracks the VOR bearing within $\pm 2^\circ$ .                                                                                                                                                                   |
| VOR Bearing Accuracy                                         | The VOR bearing tracks the OBS bearing within $\pm 2^\circ$ .                                                                                                                                                                        |



TABLE 1-1. RN-478A SPECIFICATIONS (Cont)

| Parameter                     | Specification and/or Range                                                                                                                                                                                                                                                                        |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DME Distance Accuracy         | $\pm (0.2 \text{ nautical miles} + 1\% \text{ of the distance}).$                                                                                                                                                                                                                                 |
| AREA NAVIGATION APPROACH MODE |                                                                                                                                                                                                                                                                                                   |
| Course Width                  | $\pm 1.25 \text{ nautical miles nominal per } \pm 150 \mu\text{a current in a } 1000 \text{ ohm load}.$                                                                                                                                                                                           |
| Computed Distance to Waypoint | The computed distance to waypoint should not exceed 51 nautical miles.                                                                                                                                                                                                                            |
| Approach Mode Accuracy        | Meets the same accuracy requirements as the ENROUTE mode.                                                                                                                                                                                                                                         |
| VOR/DME MODE                  |                                                                                                                                                                                                                                                                                                   |
| VOR Bearing Accuracy          | $\pm 1^\circ$                                                                                                                                                                                                                                                                                     |
| VOR Course Width              | $\pm 10^\circ$                                                                                                                                                                                                                                                                                    |
| RNAV INTERFACE SPECIFICATIONS |                                                                                                                                                                                                                                                                                                   |
| Power                         | 28 Vdc Power ( $27.5 \pm 20\%$ ) @ 1A max.<br>28/14 Vdc Switched @ 4 mA/2 mA.<br>28 V Dimmer @ .5A max.<br>Keep Alive 22 to +31 V @ 2 mA max.<br>+8 V 1A max.                                                                                                                                     |
| Signals In                    | DME Range Analog, two lines, 40 mV/NM into greater than 1 Meg ohm load.<br>Xmtr Fired, TTL signal, one line.<br>809 kHz Clock, TTL signal, one line.<br>Count Enable, TTL signal, one line.<br>NAV Composite, 1/2 VRMS 30 Hz + 1/2 VRMS 9960 Hz FM into 10 k ohm load, s + n/n greater than 6 dB. |
| RNAV/VOR                      | Switched ground, diode isolated, ground = RNAV.                                                                                                                                                                                                                                                   |
| DME Flag                      | TTL signal, one line, 0 = flag.                                                                                                                                                                                                                                                                   |
| Test                          | Switched ground, diode isolated, ground = NAV test, open ( $>100 \text{ k}\Omega$ ) = not test.                                                                                                                                                                                                   |
| Lamp Test                     | Switched ground, diode isolated, ground = lamp test.                                                                                                                                                                                                                                              |
| ILS Energize                  | Switched ground, diode isolated, ground = ILS, open = not ILS.                                                                                                                                                                                                                                    |
| Resolver                      | Resolver stator windings, four lines (SWD, SWE, SWF, SWG).                                                                                                                                                                                                                                        |

TABLE 1-1. RN-478A SPECIFICATIONS (Cont)

| Parameter          | Specification and/or Range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Signals Out        | <p>Flag/To/From, one to three loads @ 93 <math>\mu</math>a per load, or one to two loads @ 240 <math>\mu</math>a per load.</p> <p>RNAV Range Digital (gated 809 kHz Clock), TTL signal, one line.</p> <p>Vertical Pointer, two lines, 150 mV full scale from 2 ohm source, can drive 1.5 mA. Centering adjustment, <math>\pm 50</math> mV (50 <math>\mu</math>a with 1 k load). Full scale adjustment, <math>\pm 30</math> mV (30 <math>\mu</math>a with 1 k load).</p> <p>RNAV Flag, flag = open collector (less than 20 V applied).</p> <p>Vertical Flag, two lines, will drive one to three 1 k ohm flags @ <math>250 \pm 25</math> <math>\mu</math>a each.</p> <p>RNAV Lamp, switched ground, diode isolated resolver, rotor winding, two lines (RWH and RWC).</p> |
| Autopilot Commands | <p>ENR or VOR mode, open collector and diode open to ground (two lines).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Indicator          | <p>Synchro (course datum) - 5 leads.</p> <p>OBS Resolver - 6 leads and shield.</p> <p>Backcourse lamp - 2 leads, 28 V @ 24 mA.</p> <p>RNAV lamp - 2 leads 28 V @ 24 mA.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |



TABLE 1-2. UNITS AND ACCESSORIES

| Qty. | Name/Type                                                                                                             | Part No.                               |
|------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| 1    | Area Navigation Computer<br>RN-478A                                                                                   | 44100-0000<br>44100-1000<br>44100-1100 |
| 1    | Mounting                                                                                                              | 44091-0000                             |
| 1    | Indicator IN442AR*                                                                                                    | 43910-1000                             |
|      | IN442BR*                                                                                                              | 43910-1100                             |
|      | IN443AR*                                                                                                              | 43910-2000                             |
|      | IN443BR*                                                                                                              | 43910-2100                             |
|      | IN41A*                                                                                                                | 36050-0000                             |
|      | IN41D*                                                                                                                | 39270-0000                             |
| 1    | Receiver/Transmitter, DME<br>RTA-476A                                                                                 | 44000-0000                             |
| 1    | Control, DME C-476A                                                                                                   | 44020-0000                             |
|      | C-476A                                                                                                                | 44020-1000                             |
|      | C-476A                                                                                                                | 44020-1100                             |
| 1    | Mounting                                                                                                              | 44088-0000                             |
| 1    | Antenna, DME A-119A                                                                                                   | 42940-0000                             |
| 1    | Connector Kit, DME                                                                                                    | 44004-0000                             |
| 1    | Connector Kit, RNAV                                                                                                   | 44104-0000                             |
| 2    | Extender Cable (Aircraft Test)<br>or<br>Aircraft Extender Kit consisting<br>of 4 connectors for the above<br>2 cables | 45630-0000<br>61379-0000               |
| 1    | Extender Cable Kit (PCB extenders)<br>(PCB Extenders)                                                                 | 61378-0000                             |

## NOTE

For specifications, installation, regulatory compliance and other data refer to the following Service/Parts manuals:

|                                                 |          |
|-------------------------------------------------|----------|
| 400 SERIES DME (Type C-476A, RTA-476A)          | 7010382  |
| 400 NAV/COM (Type RT-428A)                      | 7010376  |
|                                                 | (D4542)  |
| 300 NAV/COM (Type RT-328T)                      | 7010386  |
| 800 NAVIGATION SYSTEM (includes R-41A Receiver) | D4505-13 |

\* One indicator supplied as specified.





## SECTION 2

### INSTALLATION

#### 2-1. UNPACKING.

Carefully unpack the equipment received. Inspect each unit for possible damage incurred during shipment. Check the items received against the packing slip to be sure all items have been received and removed from the packing case.

#### 2-2. INSPECTION AND ADJUSTMENTS.

All tests and adjustments, prior to installation, are performed in accordance with Section 5.

#### 2-3. AIRCRAFT CABLE INSTALLATION.

##### 2-4. Mounting Of RNAV Connectors.

Mount connector inserts P7 and P8 (see figure 2-2) part numbers 38423-0055 and 38423-0059, respectively, on the rear bracket of mounting assembly 44091-0000, as shown in figure 2-1. Use self-locking nuts, part number 8950-0040, to mount guide pins and secure connectors to mounting assembly. Connectors are to be floated: back nuts off one quarter turn from fully tightened position.

##### 2-5. Aircraft Wiring to P7 and P8.

Referring to figures 2-1 and 2-2 insert pin terminated wires into corresponding pin holes of connector inserts P7 and P8.

#### 2-6. INSTALLATION OF MOUNTING ASSEMBLY.

Refer to figures 2-3 and 2-5 for installation method of mounting assemblies in aircraft panel openings.

#### NOTE

The mounting surface of the aircraft must be clean bare metal, to ensure proper grounding.

There are a total of six 0.144 inch diameter mounting holes (three per side) for fastening the mounting assembly.

#### 2-7. RNAV Interconnections To Auxiliary Equipment.

Connections to the deviation indicator, the DME control unit, DME receiver/transmitter, VHF navigation receiver, autopilot, and the antenna are shown in figure 2-2.

#### 2-8. INSTALLATION ADJUSTMENTS.

##### 2-9. RNAV To DME Matching Procedure.

- Step 1. Remove RNAV from its mounting in aircraft, if previously installed.
- Step 2. Using aircraft test extender cables, part number 45630-0000, connect J2 of RNAV to P7 and J1 to P8 of mounting assembly. Refer to figure 2-1 for location of P7 and P8.
- Step 3. Using test equipment, NAV 401L VOR ramp tester or equivalent and ATL-600 DME ramp tester or equivalent, apply the following signals:
  - a. Apply a standard "0° FROM" VOR test signal to the VHF navigation antenna.
  - b. Apply a standard 5.0 nautical mile DME signal to the DME antenna.
- Step 4. Set RNAV Switches as follows:
  - a. Set ENR/APPR Switch to ENR position.
  - b. Set DSPL 1/2 Switch to position 1.
  - c. Set FLY 1/2 Switch to position 1.
  - d. Set DISTANCE minilever switches to 000.0.
  - e. Set BEARING minilever switches to 000.0.
- Step 5. Turn VHF navigation receiver power switch to the "on" position.

Step 6. Set DME power switch to the ON position.

Step 7. Set DME to the NAV 1 mode.

Step 8. Range the DME, and adjust test equipment, to obtain a display of 5.0 nautical miles.

Step 9. Set DME to RNAV mode, and press XFER button.

### NOTE

All adjustment points are accessible through holes in bottom cover of the RNAV as shown in figure 2-4.

Step 10. Adjust R85 such that TO/FROM indicator on the CDI indicates "FROM" and the DME control unit displays 4.9 nautical miles.

Step 11. Set the DME to NAV 1 mode.

Step 12. Range the DME, and adjust test equipment, to obtain a display of 80.0 nautical miles.

Step 13. Set DME to RNAV mode.

Step 14. Adjust R91 on RNAV to obtain a display of 80.0 nautical miles.

Step 15. Repeat steps 7 through 9 inclusive.

Step 16. Observe that 4.9 nautical miles is displayed on DME. If not, readjust R85 on RNAV until 4.9 nautical miles is displayed.

Step 17. Repeat steps 11 through 13 inclusive.

Step 18. Eighty (80.0) nautical miles should be displayed on the DME. If not, readjust R91 on RNAV until 80.0 nautical miles is displayed.

### 2-10. Procedure For Matching RNAV To Navigation Receiver.

Step 1. Perform steps 1 and 2 of paragraph 2-9.

Step 2. Using test equipment (refer to paragraph 2-9, step 3) apply a standard "0° FROM" VOR test signal to the NAV antenna.

Step 3. Set DME control unit to the NAV 1 mode.

Step 4. Set omnibearing selector (OBS), on the CDI, to 000°.

Step 5. Adjust R56 on RNAV until CDI is centered.

Step 6. Set DME control unit to RNAV mode.

Step 7. Set RNAV switches as follows:

a. Set DISTANCE minilever switches to 20.0.

b. Set BEARING minilever switches to 180.0.

c. Set ENR/APPR Switch to APPR position.

d. Set DISPL 1/2 Switch to 1.

e. Set FLY 1/2 Switch to 1.

f. Press XFER button.

g. Observe that 20.0 and 180.0 are illuminated on RNAV incandescent display.

Step 8. Set the navigation receiver to VOR test position.

Step 9. Adjust R24 on RNAV until CDI is centered.

Step 10. Set DME control unit to NAV 1 mode.

Step 11. Observe that CDI is centered. If not, adjust R56, on RNAV, until CDI is centered.

Step 12. Set DME control unit to RNAV mode.

Step 13. Observe that CDI is centered. If not, adjust R24, on RNAV, until CDI is centered.

### 2-11. Installation of RNAV.

After the RNAV mounting assembly and its associated aircraft wiring have been installed and the installation adjustments completed, the RNAV may be installed.

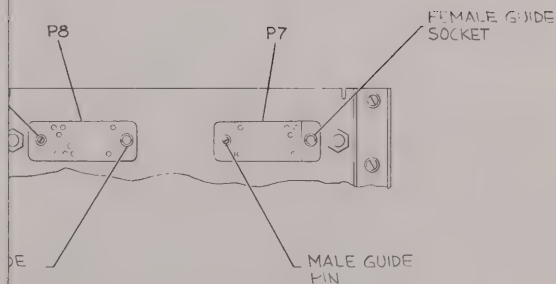
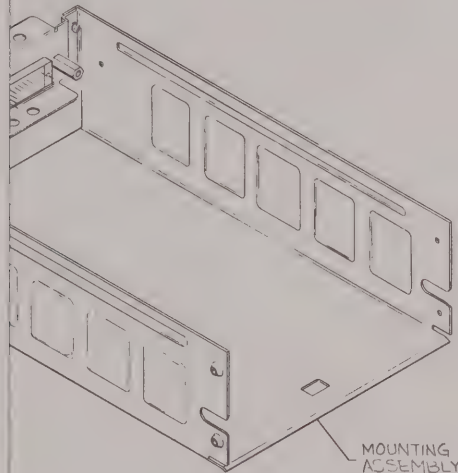
#### CAUTION

Before installing RNAV, ascertain that all power is turned off.

Slide the RNAV into the mounting assembly until RNAV connectors J1 and J2 mate with mounting assembly connectors P8 and P7 respectively. Turn locking pawl at the bottom center of the RNAV front panel clockwise until the RNAV is pulled firmly into the panel.



- Step 5. Perform procedures of paragraph 2-10, steps 2 through 4.
- Step 6. Observe that CDI is centered.
- Step 7. Perform procedures of paragraph 2-10, steps 6 through 8.
- Step 8. Observe that CDI is centered.
- Step 9. Set DME control unit to NAV 1 mode.
- Step 10. Observe that CDI is centered.
- Step 11. Set DME control unit to RNAV mode.
- Step 12. Observe that CDI is centered.



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of Connectors P7 and P8 on Mounting Assembly

Step 6. Set DME power switch to the ON position.

Step 7. Set DME to the NAV 1 mode.

Step 8. Range the DME, and adjust test equipment, to obtain a display of 5.0 nautical miles.

Step 9. Set DME to RNAV mode, and press XFER button.

### NOTE

All adjustment points are accessible through holes in bottom cover of the RNAV as shown in figure 2-4.

Step 10. Adjust R85 such that TO/FROM indicator on the CDI indicates "FROM" and the DME control unit displays 4.9 nautical miles.

Step 11. Set the DME to NAV 1 mode.

Step 12. Range the DME, and adjust test equipment, to obtain a display of 80.0 nautical miles.

Step 13. Set DME to RNAV mode.

Step 14. Adjust R91 on RNAV to obtain a display of 80.0 nautical miles.

Step 15. Repeat steps 7 through 9 inclusive.

Step 16. Observe that 4.9 nautical miles is displayed on DME. If not, readjust R85 on RNAV until 4.9 nautical miles is displayed.

Step 17. Repeat steps 11 through 13 inclusive.

Step 18. Eighty (80.0) nautical miles should be displayed on the DME. If not, readjust R91 on RNAV until 80.0 nautical miles is displayed.

### 2-10. Procedure For Matching RNAV To Navigation Receiver.

Step 1. Perform steps 1 and 2 of paragraph 2-9.

Step 2. Using test equipment (refer to paragraph 2-9, step 3) apply a standard "0° FROM" VOR test signal to the NAV antenna.

Step 3. Set DME control unit to the NAV 1 mode.

Step 4. Set omnibearing selector (OBS), on the CDI, to 000°.

Step 5. Adjust R56 on RNAV until CDI is centered.

Step 6. Set DME control unit to RNAV mode.

Step 7. Set RNAV switches as follows:

a. Set DISTANCE minilever switches to 20.0.

b. Set BEARING minilever switches to 180.0.

c. Set ENR/APPR Switch to APPR position.

d. Set DISPL 1/2 Switch to 1.

e. Set FLY 1/2 Switch to 1.

f. Press XFER button.

g. Observe that 20.0 and 180.0 are illuminated on RNAV incandescent display.

Step 8. Set the navigation receiver to VOR test position.

Step 9. Adjust R24 on RNAV until CDI is centered.

Step 10. Set DME control unit to NAV 1 mode.

Step 11. Observe that CDI is centered. If not, adjust R56, on RNAV, until CDI is centered.

Step 12. Set DME control unit to RNAV mode.

Step 13. Observe that CDI is centered. If not, adjust R24, on RNAV, until CDI is centered.

### 2-11. Installation of RNAV.

After the RNAV mounting assembly and its associated aircraft wiring have been installed and the installation adjustments completed, the RNAV may be installed.

#### CAUTION

Before installing RNAV, ascertain that all power is turned off.

Slide the RNAV into the mounting assembly until RNAV connectors J1 and J2 mate with mounting assembly connectors P8 and P7 respectively. Turn locking pawl at the bottom center of the RNAV front panel clockwise until the RNAV is pulled firmly into the panel.

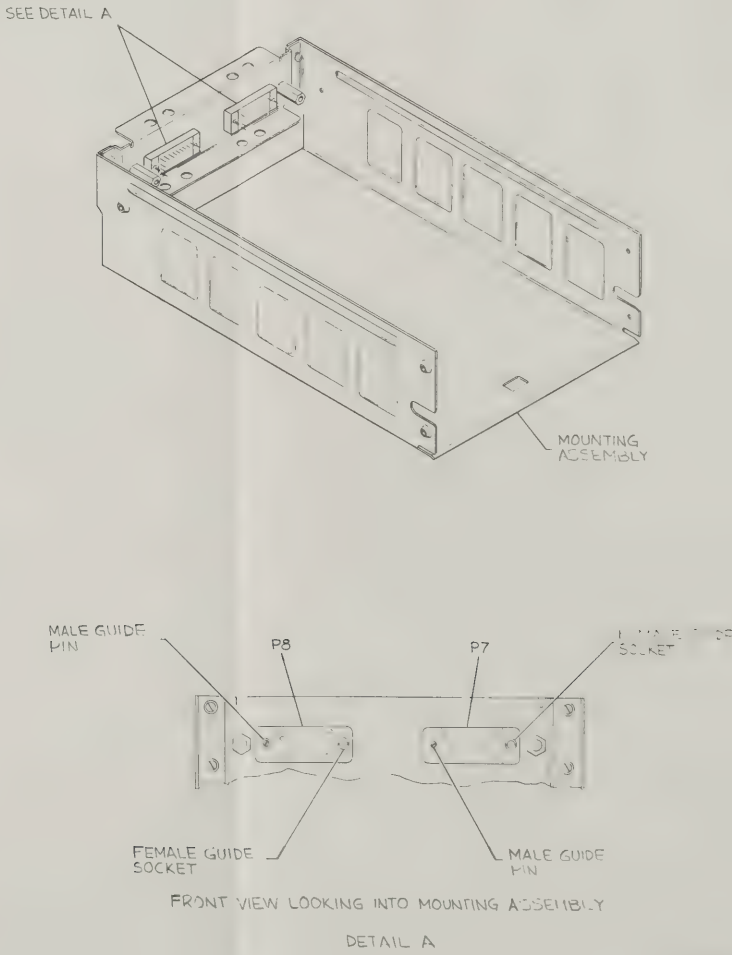


2-12. POSTINSTALLATION TESTS.

If any of the following tests fail, reperform all relevant adjustments of paragraphs 2-9 and 2-10.

- Step 1. Perform procedures of paragraph 2-9, steps 3 through 9.
- Step 2. Observe that TO/FROM indicator on the CDI indicates FROM and the DME control unit displays 4.9 nautical miles.
- Step 3. Perform procedures of paragraph 2-9, steps 11 through 13.
- Step 4. Observe that DME displays 80 nautical miles.

- Step 5. Perform procedures of paragraph 2-10, steps 2 through 4.
- Step 6. Observe that CDI is centered.
- Step 7. Perform procedures of paragraph 2-10, steps 6 through 8.
- Step 8. Observe that CDI is centered.
- Step 9. Set DME control unit to NAV 1 mode.
- Step 10. Observe that CDI is centered.
- Step 11. Set DME control unit to RNAV mode.
- Step 12. Observe that CDI is centered.



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Figure 2-1. Orientation of Connectors P7 and P8 on Mounting Assembly





|   |    |                                     |
|---|----|-------------------------------------|
| 9 | J1 | IN-44 ( ) ( ) R DEVIATION INDICATOR |
| 4 |    | HORIZ FLAG + CONC                   |
| 6 |    | HORIZ FLAG - CONC                   |
| 2 |    | HORIZ POINTER + DOWN                |
| 3 |    | HORIZ POINTER + UP                  |
| 5 |    | RNAV LAMP                           |
| 8 |    | RNAV LAMP                           |
| 7 |    | RWH                                 |
| 6 |    | RWC                                 |
| 1 |    | SWE                                 |
| 0 |    | SWG                                 |
| 3 |    | SWD                                 |
| 7 |    | SWF                                 |
| 2 |    | SHIELD                              |
|   |    | RESOLVER                            |
| 5 |    | FLAG/TO-FROM (+FROM)                |
| 3 |    | FLAG/TO-FROM (+TO)                  |
| 2 |    | VERT POINTER (+ LEFT)               |
|   |    | VERT POINTER (+RIGHT)               |
| 3 |    | STATOR X                            |
| 4 |    | STATOR Y                            |
| 0 |    | STATOR Z                            |
| 1 |    | ROTOR H                             |
| 5 |    | ROTOR C                             |
|   |    | SYNCHRO (BEARING)                   |
| 7 |    | BACKCOURSE LAMP                     |
| 0 |    | BACKCOURSE LAMP                     |

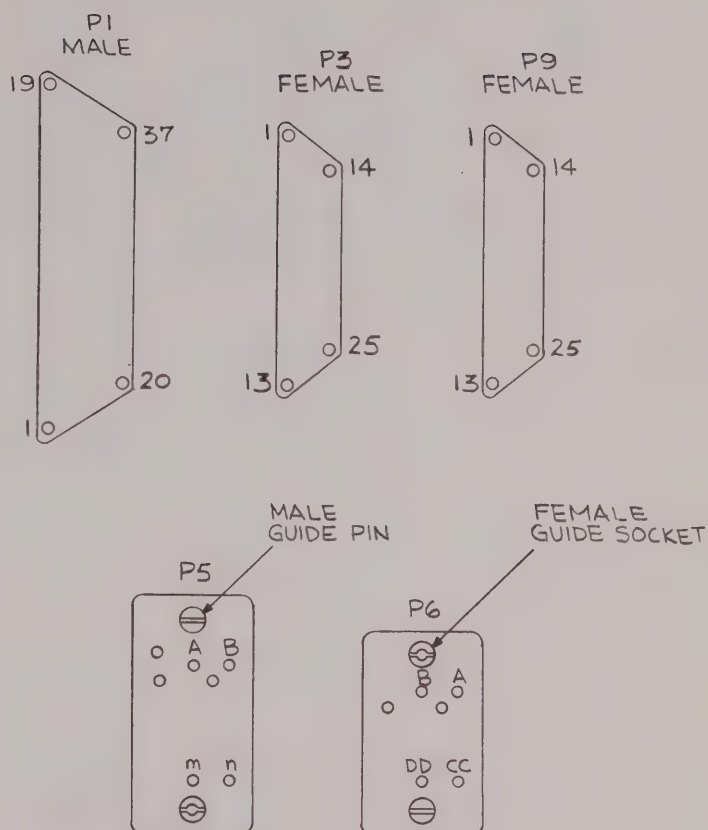


Figure 2-2. RNAV Installation Interconnection Diagram



## NOTES:

1. All unmarked wires shall be No. 22 AWG.
  2. Shielded wires shall be RG-188/U, RG-174/U or ARC approved substitute coax.
  3. Shielded twisted pair shall be No. 22 AWG.
  4. Connect to non-switched aircraft power (24 V) through a breaker.
  5. No. 22 AWG shielded wire. Individual shielded wires may be used.
  6. Connect pin "L" for 0° NAV signals. Connect pin "K" for 180° NAV signals. The phase connection relative to NAV receiver models is as follows:
- | NAV RECEIVER | PHASE SHIFT (NOMINAL) |
|--------------|-----------------------|
| RT-328T      | 180°                  |
| RT-428A      | 180°                  |
| R-41A        | 0°                    |
7. In dual RNAV installations, each RNAV is dedicated to one NAV receiver and one DME only.
  8. The RNAV may be dedicated to either VHF NAV 1 or VHF NAV 2 receiver. Therefore connect P6-Y and P6-AA to the VHF NAV receiver to be used with the RNAV.
  9. Connect P8-M to P9-15 for one to three deviation indicators or equivalent. For heavier loads, up to 500 microamps, connect P8-AA to P9-15.

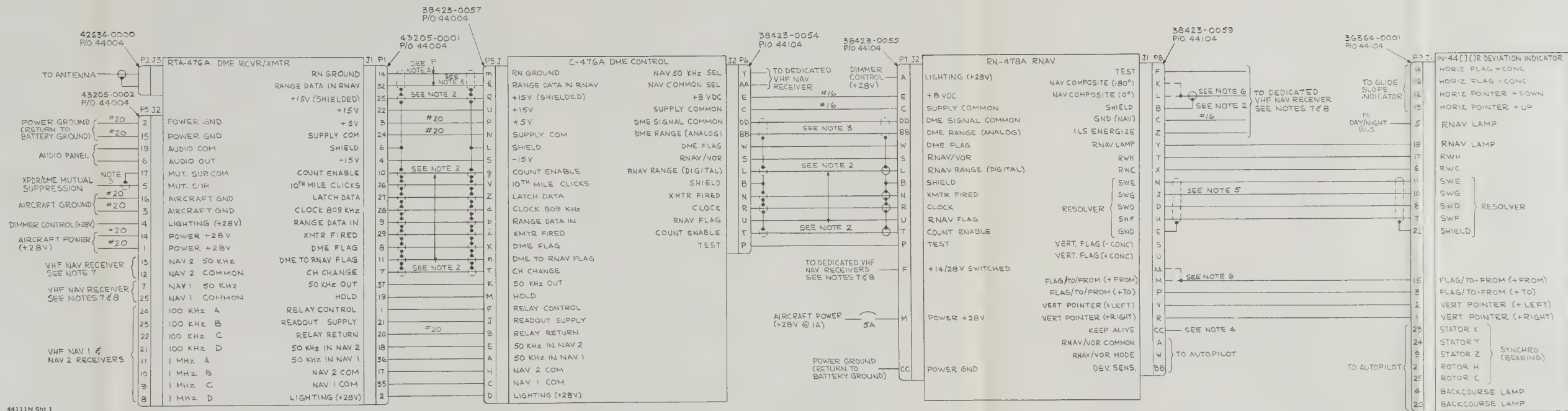


Figure 2-2. RNAV Installation Interconnection Diagram



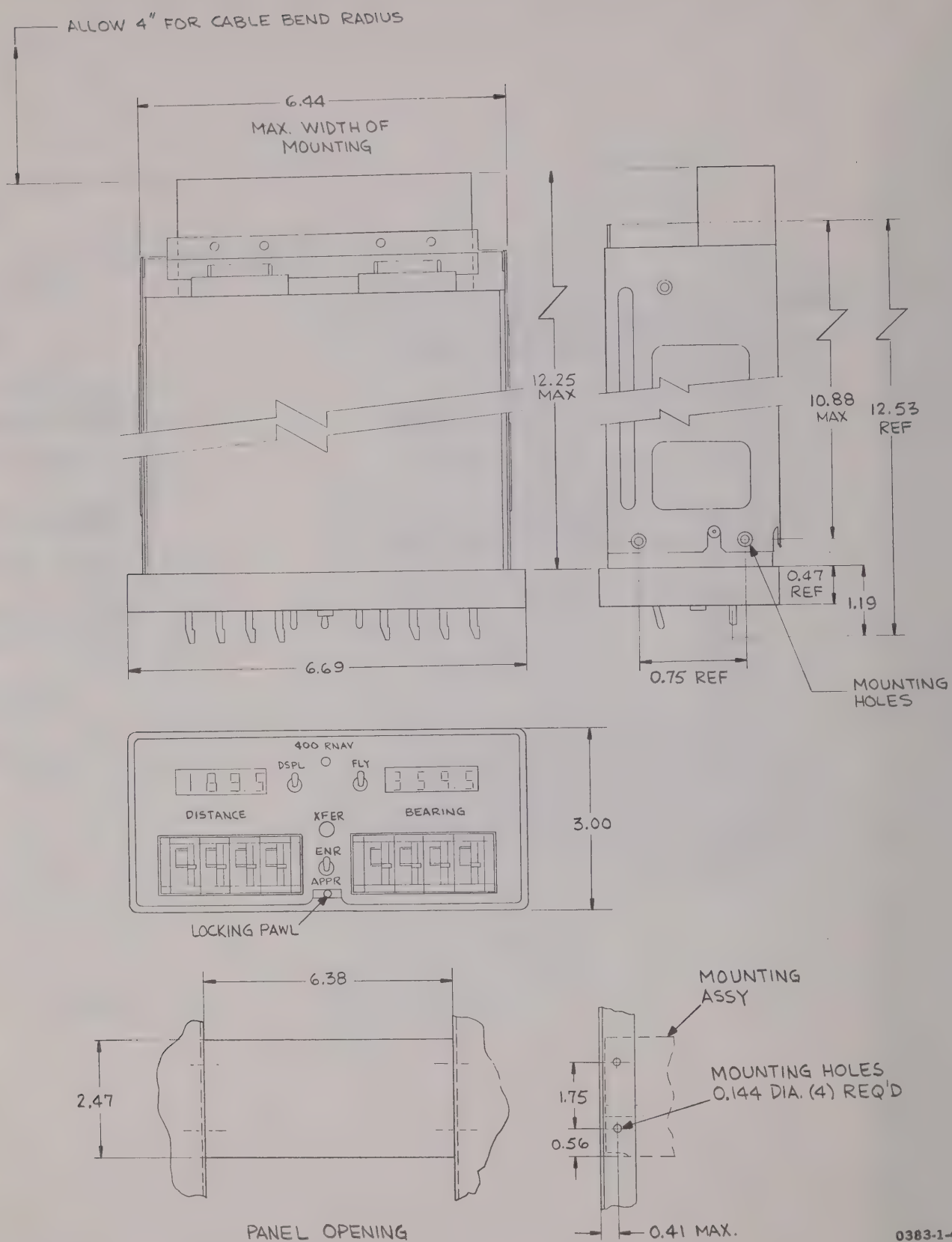
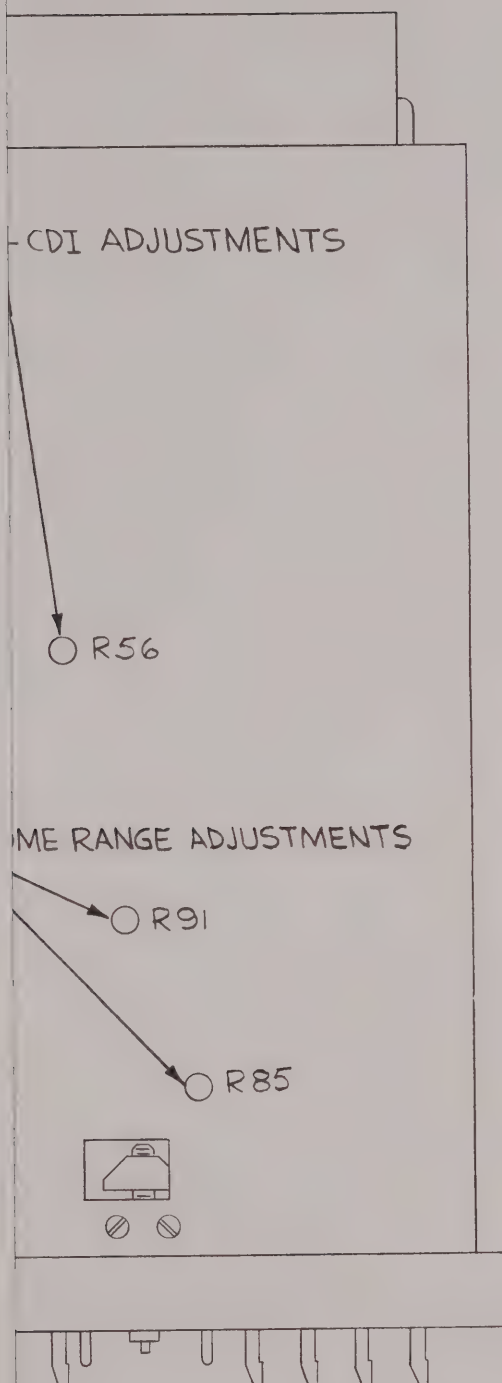


Figure 2-3. RNAV Installation



0383-1-5

on of RNAV Adjustments on Bottom Cover

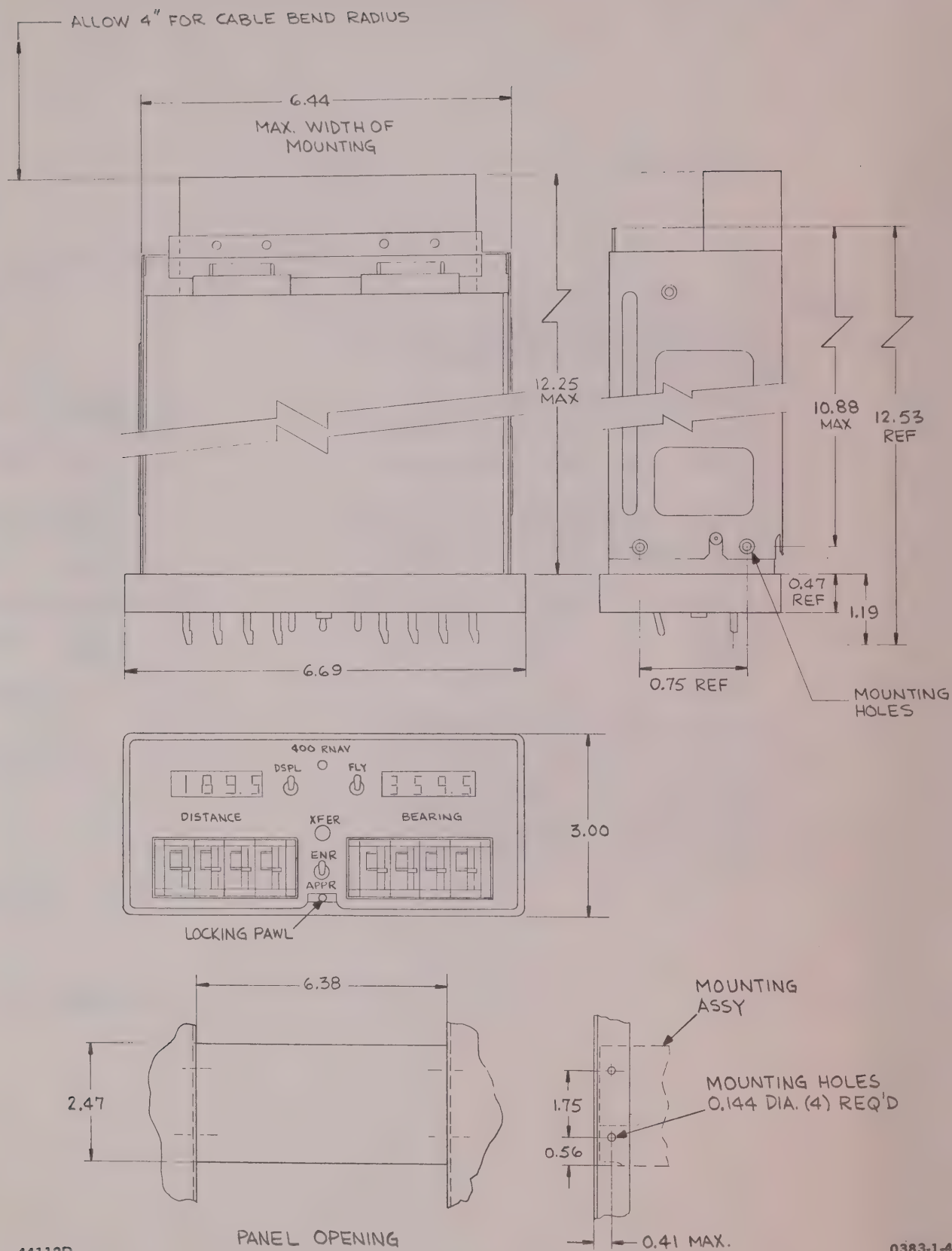
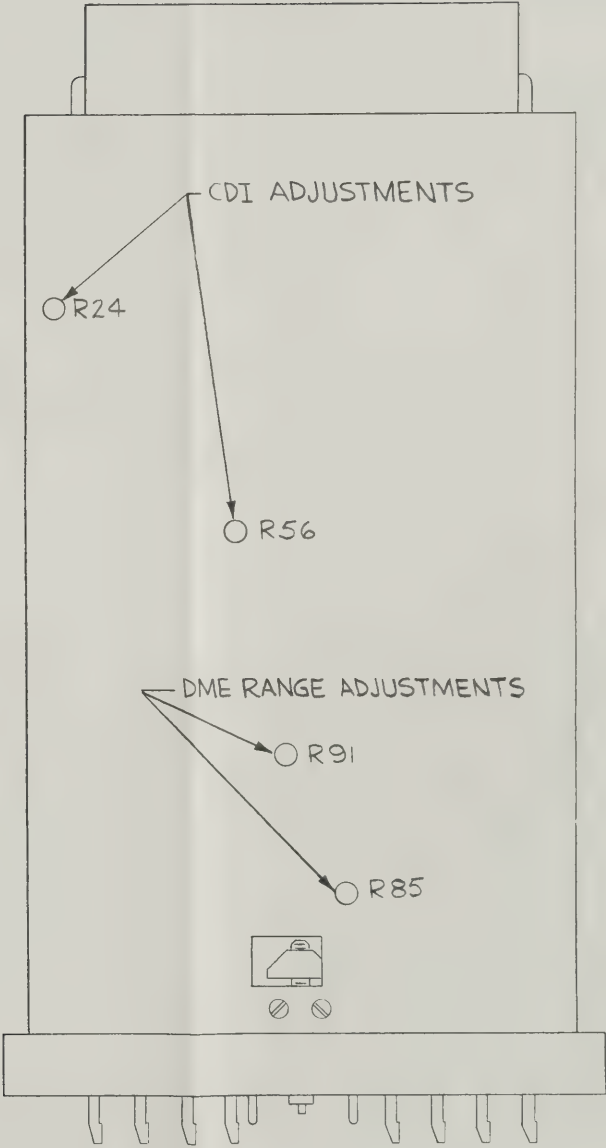


Figure 2-3. RNAV Installation

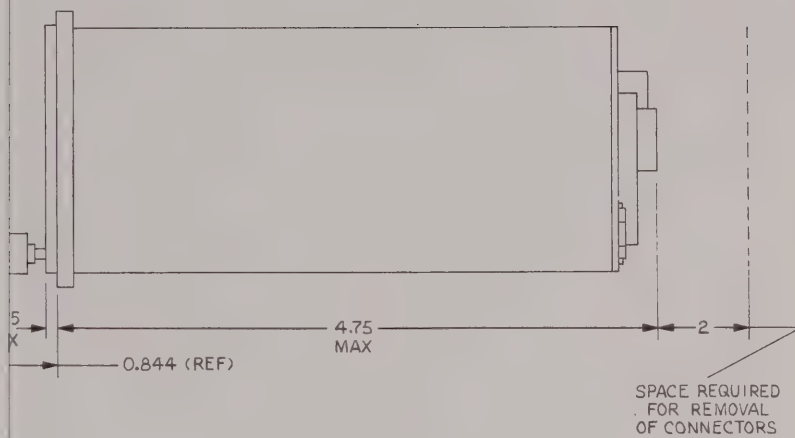




0383-1-5

Figure 2-4. Location of RNAV Adjustments on Bottom Cover





1A  
 $0.260$  X  $0.260$  DIA  
 (D)

DIA

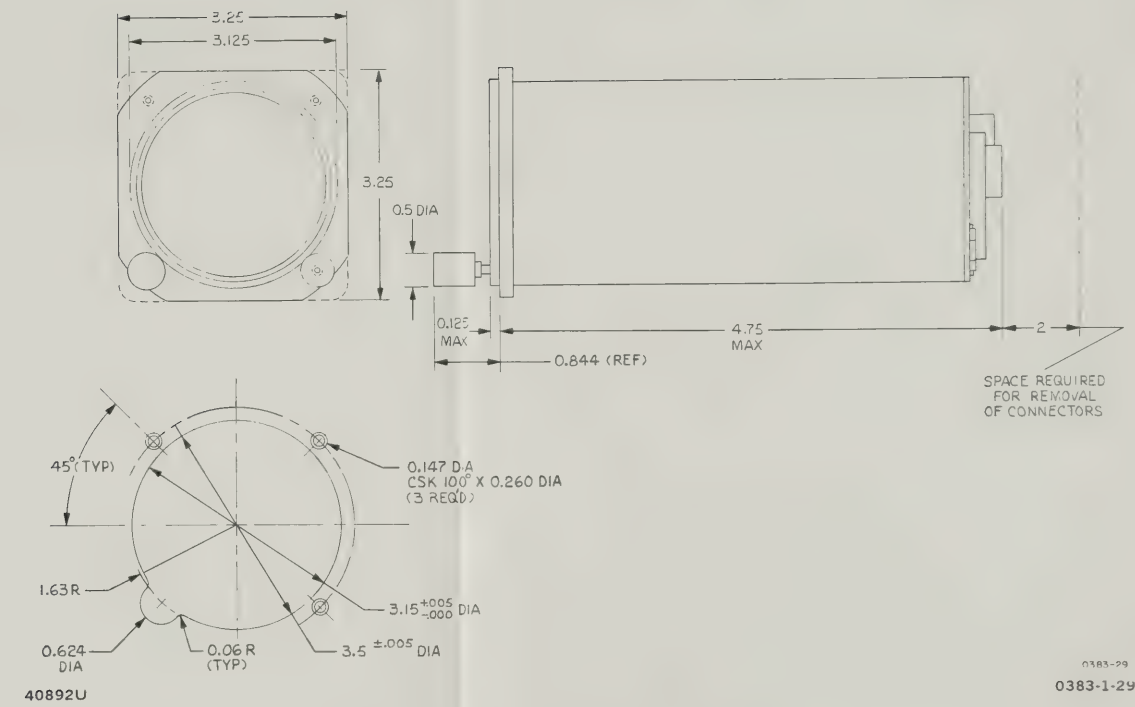
0383-29  
 0383-1-29

Hardware: 3(6-32 UNC-2A x  $3/4$  lg screws)

Figure 2-5. Indicator Installation







**NOTE:**  
Mounting Hardware: 3(6-32 UNC-2A x 3/4 lg screws)

*Figure 2-5. Indicator Installation*





## SECTION 3

### OPERATION

#### 3-1. FUNCTIONAL OPERATION.

The RN-478A Area Navigation Computer (RNAV) includes circuits which process navigation signals from a VHF navigation receiver to produce relative bearing and lateral steering information for display by a course deviation indicator (CDI) or horizontal situation indicator (HSI). Additional computer circuits are used to combine VOR bearing and DME distance information with waypoint bearing and distance data to establish navigation data. The navigation data are displayed on the CDI-HSI and DME as an on-track "phantom" VORTAC. (Refer to the Avionics operations guide for further details on the techniques of area navigation.)

#### 3-2. OPERATING CONTROLS AND DISPLAYS.

All operating controls and displays which are located on the RNAV are depicted in figure 3-1 and described in table 3-1.

#### 3-3. AUXILIARY CONTROLS.

Other controls required for the operation of the RNAV are found on the VHF navigation receiver, the DME, and the CDI (or HSI). Refer to the interconnection diagram (see figure 2-2) for proper signal and power requirements.

#### 3-4. OPERATING SEQUENCE.

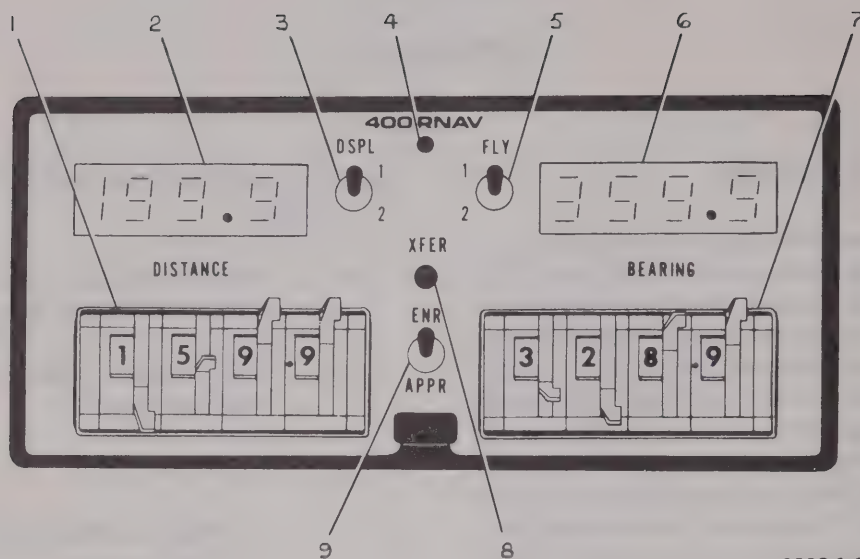
##### 3-5. Turn On Procedures.

Power to the RNAV is supplied from the aircraft power with the turn on command located on the VHF navigation receiver. Data inputs are supplied by both the VHF navigation receiver and the DME.

- Step 1. Turn on the VHF navigation receiver.
- Step 2. Tune the VHF navigation receiver to the desired VOR/LOC frequency.
- Step 3. Turn on the DME.

#### 3-6. VOR NAVIGATION CIRCUITS VERIFICATION TESTS.

- Step 1. DME Operating Controls - Set Mode Selector Switch to dedicated NAV.
- Step 2. VHF navigation receiver operating controls - Preset as follows:
  - a. Receiver - ON.
  - b. Frequency selector switches - Set to usable VOR frequency.
- Step 3. Course indicator OBS or CRS on HSI - Set to 0° on course index.
  - a. Deviation indicator - Centers or deflects left or right, depending on VOR bearing.
  - b. OFF/TO-FROM indicator - Shows FROM, TO or FLAG.
- Step 4. VHF navigation receiver ID-T switch - Press to T and hold.
  - a. Deviation indicator - Centers.
  - b. OFF/TO-FROM indicator - Shows FROM.
  - c. VHF navigation receiver frequency - Read-out is 188.88 on 400 Nav/Com radio.
- Step 5. Course indicator OBS or CRS on HSI - Turn to course of 10°.
  - a. Deviation indicator - Deflects to full scale, right.
  - b. OFF/TO-FROM indicator - Shows FROM.
- Step 6. Course indicator OBS or CRS on HSI - Turn to course of 350°.



0383-1-6

Figure 3-1. RN-478A Controls and Displays

TABLE 3-1. OPERATING CONTROLS AND DISPLAYS

| Index<br>Figure 3-1 | Designation                                         | Function                                                                                                                                                                                                                                                                                                 |
|---------------------|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                   | DISTANCE minilever switches and mechanical displays | Used as the input device to the RNAV electronic memory for waypoint distance data. The numerals displayed represent the value to be transferred. The DISTANCE mechanical displays have a range of from 0.0 to 199.9 NM. Also serves as a mechanical storage for the third waypoint distance information. |
| 2                   | DISTANCE incandescent displays                      | Displays one of two distance data (in nautical miles) stored in electronic memory. The DISTANCE display capability ranges from 0.0 to 199.9 NM.                                                                                                                                                          |
| 3                   | Display 1/2 switch                                  | Selects for display one of two waypoints stored in electronic memory. Additionally, the switch position determines which of the two electronic memory positions will receive the data to be transferred.                                                                                                 |
| 4                   | Fly/Display annunciator lamp                        | When flashing yellow, indicates that the data displayed is not the data the RNAV computer is processing.                                                                                                                                                                                                 |

TABLE 3-1. OPERATING CONTROLS AND DISPLAYS - Continued

| Index<br>Figure 3-1 | Designation                                        | Function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5                   | FLY 1/2 switch                                     | Determines which of the two electronically stored waypoints is to be used by the computer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 6                   | BEARING incandescent display                       | Displays one of two bearing data (in degrees) stored in electronic memory. The BEARING display capability ranges from 000.0 to 359.9 degrees.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 7                   | BEARING minilever switches and mechanical displays | <p>Used as the input device to the RNAV memory for waypoint bearing data. The numerals displayed represent the value to be transferred. The BEARING mechanical display switches have a range of from 000.0 to 399.9 degrees. Also serves as a mechanical storage for the third waypoint bearing information.</p> <p><b>NOTE</b><br/>An attempt to transfer bearing data greater than 359.9 degrees will result in the computer entering the lamp test signal. The DISTANCE/BEARING incandescent displays will indicate 188.8 and 888.8 respectively. The other RNAV electronic memory is not affected. To obtain proper results, the minilevers should be corrected and the data transferred again.</p> |
| 8                   | XFER switch                                        | When depressed, will cause the contents of the DISTANCE and BEARING minilevers to be transferred to the memory location determined by the DSPL switch.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 9                   | ENR/APPR switch                                    | Controls the width of the navigation corridor. ENR (enroute) position provides the standard $\pm 5$ NM enroute sensitivity; APPR (approach) position provides the standard $\pm 1 \frac{1}{4}$ NM approach course sensitivity.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |



a. Deviation indicator - Deflects to full scale, left.

b. OFF/TO-FROM indicator - Shows FROM.

Step 7. VHF navigation receiver ID-T switch - Release.

a. VHF navigation receiver frequency - Readout returns to selected test frequency.

b. Deviation indicator - Centers or deflects left or right, depending on VOR bearing.

c. OFF/TO-FROM indicator - Shows TO or FROM, depending on VOR signal.

### 3-7. DISPLAY RELIABILITY TESTS.

Step 1. VHF navigation receiver - ON.

Step 2. DME TEST/ON-OFF switch - ON.

Step 3. VHF navigation receiver frequency selector switches - Set to VOR frequency.

Step 4. RNAV DSPL and FLY switches - DSPL set to 1, FLY set to 2.

a. Readout - Displays first waypoint bearing and distance.

b. Annunciator lamp - Flashes.

Step 5. RNAV DSPL and FLY switches - DSPL set to 2, FLY set to 1.

a. Readout - Displays second waypoint bearing and distance.

b. Annunciator lamp - Flashes.

Step 6. RNAV DSPL and FLY switches - Both set to same number.

a. Readout - Displays waypoint bearing and distance as selected by DSPL switch.

b. Annunciator lamp - Not lighted.

Step 7. DME mode selector switch - Set to RNAV.

a. Both RN and NM displays on DME distance-to-station - Display is lighted.

b. RN lamp on course indicator - Lights.

Step 8. VHF navigation receiver frequency selector switches - Set to LOC frequency.

a. DME distance-to-station display - Blank.

b. RN lamp on course indicator - Not lighted.

c. Course indicator OFF/TO-FROM indicator - OFF.

Step 9. DME mode selector switch - Set to NAV 1, NAV 2, or HOLD.

a. NM display on DME distance-to-station - Display is lighted.

b. RN lamp on course indicator - Not lighted.

c. Course indicator OFF/TO-FROM indicator - Shows TO if a usable signal is received.

Step 10. DME mode selector switch - RNAV.

Step 11. DME TEST/ON-OFF switch - Hold to TEST.

a. DME RN/NM distance-to-station display - Readout is 188.8.

b. DME KTS/MIN time-to-station/ground speed display - Readout is 888.

c. RNAV bearing display - Readout is 888.8.

d. RNAV distance display - Readout is 188.8.

### 3-8. AREA NAVIGATION CIRCUITS SELF-TEST.

The following test requires valid VOR and DME signals.

Step 1. VHF navigation receiver - ON.

Step 2. VHF navigation receiver frequency selector switches - Set to VOR frequency.

Step 3. DME TEST/ON-OFF switch - ON.

Step 4. DME mode selector switch - RNAV.

Step 5. RNAV computer - Programmed to waypoint 1. Distance must not be zero.

- Step 6. DSPL and FLY switches - Set both to 1.
- BEARING display - Readout is waypoint 1 bearing.
  - DISTANCE display - Readout is waypoint 1 distance.
  - Course indicator - RN lamp lights.
- Step 7. Course indicator OBS or CRS on HSI - Set to waypoint 1 bearing.
- Step 8. VHF navigation receiver ID-T switch - Hold in T position.
- Course indicator deviation indicator - Centers.
  - Course indicator OFF/TO-FROM indicator - Shows TO.
  - DME distance-to-station display - Readout is the same as the RNAV DISTANCE readout.

### 3-9. Ramp Check Procedures.

- Step 1. Set up ramp checker for 0° VOR bearing (To), and DME 100 nautical mile range. Set the navigation receiver to the corresponding VOR frequency.
- Step 2. Set DME mode selector to dedicated NAV.
- Step 3. Set OBS to 0°. CDI vertical needle should center and To/From annunciator should indicate TO. DME should display 100.0 NM.
- Step 4. Set waypoint DISTANCE to 99.9 and BEARING to 90.0°. Press XFER.
- Step 5. Set OBS to 45°.
- Step 6. Set DME mode selector to RNAV. CDI green RN lamp should light. CDI vertical needle should center and To/From annunciator should indicate TO. DME should display 141.4 NM.
- Step 7. Set waypoint DISTANCE and BEARING to 0. Press XFER. DME should display 100.0 NM. CDI centers on 0° (To).

### 3-10. RNAV CROSS CHECK.

- Step 1. Enter waypoint 000.0°/0.0 NM.

- Step 2. Center CDI needle and note distance to waypoint.
- Step 3. Set DME selector switch to dedicated NAV.
- Step 4. DME readout should be the same as in step 2 and the CDI needle should remain centered consistent with aircraft speed and direction.

### 3-11. VOR/LOC Operating Procedure.

- Step 1. Set DME selector switch to NAV 1 or NAV 2 (in either case the selected DME signal will be processed). The dedicated VOR navigation signal will be processed and displayed on the CDI or HSI.
- Step 2. Steer the aircraft in the conventional VOR/LOC manner.

#### NOTE

If the DME control unit is removed, the RNAV is automatically in the VOR/LOC mode.

### 3-12. RNAV Operating Procedure.

To enter the selected waypoints into memory, proceed as follows:

- Step 1. Set the DME selector switch to the RNAV position.
- Step 2. Set DSPL 1/2 switch to position 1 or 2 as desired.
- Step 3. Set waypoint data (distance and bearing) into their respective minilever mechanical displays.
- Step 4. Press the XFER switch and hold momentarily. The incandescent displays will reflect the values indicated by the minilever mechanical displays.
- Step 5. Set the DSPL 1/2 switch to the alternate position.
- Step 6. Repeat steps 3, 4 and 5 using as data the next waypoint.
- Step 7. Set the next succeeding waypoint into the minilever mechanical displays.

## NOTE

While airborne, and after passing the first waypoint, the third waypoint is entered by setting the DSPL 1/2 switch to the desired position and depressing the XFER switch.

- Step 8. Use the CDI left-right steering data and DME distance data in the same manner as it is used during VOR/LOC operations.

### 3-13. Turn Off Procedure.

Power to the RNAV is turned off at the VHF navigation receiver. Data entered into memory is not destroyed when power is removed.

### 3-14. EMERGENCY OPERATIONS.

The inclusion of an RNAV unit does not alter the emergency procedures of the recipient aircraft.

### 3-15. OPERATIONS.

Figure 3-2 illustrates a typical area navigation problem and the use of area navigation techniques. The normal procedures would require that the aircraft fly directly to the nearby VORTAC and then take up an outbound heading to the waypoint. With the use of RNAV, a direct course to destination may be flown while still utilizing the VORTAC as the primary source of navigation.

### 3-16. RNAV Mode.

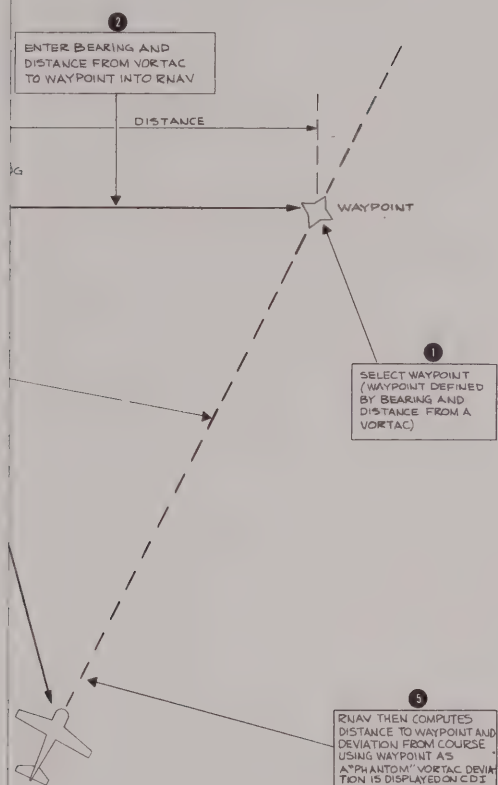
As shown in figure 3-2, the RNAV computer uses an arbitrarily selected waypoint as a "phantom" VORTAC. Thus, any course may be selected without the constraint of flying directly to or from a VORTAC. In the RNAV mode, the CDI vertical needle indicates the deviation from the selected course in distance rather than an angle (as in VOR). Other than this, the indicator and the DME treat the waypoint as if it were a VORTAC: showing TO inbound to the waypoint, FROM outbound from the waypoint, and the DME distance to or from the waypoint.

In addition, the RNAV provides two deviation sensitivities: ENR (enroute) provides a full scale deflection of the vertical needle for a 5 nautical mile deviation, and APPR (approach) provides a full scale deflection for a 1 1/4 nautical mile deviation.

### 3-17. VOR/LOC Mode.

Tuning the VHF receiver to an active VOR frequency with the DME switched to a NAV mode causes the RNAV to function as a standard VOR converter. The aircraft may then be flown in the conventional VOR manner. Tuning the VHF receiver to an active localizer frequency will cause the RNAV to switch to LOC mode. If the DME is in the RNAV mode, a blank display will result. The green "RN" light on the CDI will remain on. When the DME is switched to a NAV mode, the aircraft may be flown in the conventional ILS approach manner.





### 3-2. RNAV Computer Geometry

## NOTE

While airborne, and after passing the first waypoint, the third waypoint is entered by setting the DSPL 1/2 switch to the desired position and depressing the XFER switch.

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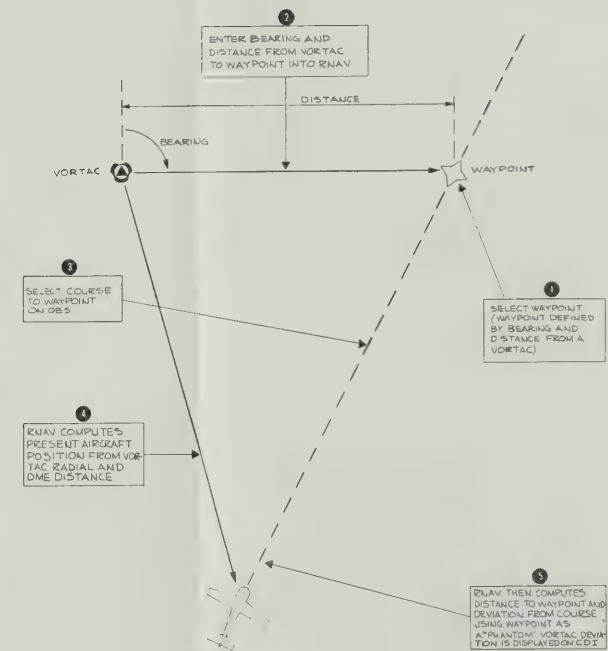


Figure 3-2. RNAV Computer Geometry





## SECTION 4

## TROUBLE SHOOTING

## 4-1. GENERAL.

This section is divided into the following two levels: RNAV block diagram description, which introduces the basic principles of operation and describes the main signal paths through the equipment; and functional block diagrams, which describe the function of each PCB in detail and provides sufficient information to localize a problem to a board or major function.

## 4-2. CMOS Logic.

CMOS logic is used extensively in the RN-478A RNAV. This type of logic uses less power, has a greater fanout, and tolerates a greater range of supply voltages than TTL. CMOS logic 1 and 0 levels are expressed in relation to the supply voltage; a 1 output should be within 1% of the supply voltage, and a 0 output should be within 1% of ground. CMOS IC's should be handled in accordance with the manufacturer's instructions. Most CMOS units in the RNAV are manufactured by either RCA or Motorola, and the handbooks published by these companies should be consulted for further details.

## 4-3. RNAV BLOCK DIAGRAM DESCRIPTION.

The basis of VOR or RNAV operation begins with the VORTAC transmission, which is demodulated in the NAV receiver to the NAV Composite signal. The NAV Composite signal contains a 30 Hz Reference Signal (in a 9960 Hz subcarrier), which represents magnetic north, and a 30 Hz Variable whose phase difference from the Reference Signal represents the aircraft bearing from the VORTAC. The analogy between phase and bearing is exact. For example, if the Variable lags the Reference by  $90^\circ$ , then the bearing from the VORTAC is  $90^\circ$ . The sine waves may also be converted to square waves and still exactly represent the phase of the original sine wave. This is done extensively in the RNAV in order to process the data with digital circuitry.

The RN-478A RNAV (figure 4-1) is part of a system which includes a 476A DME, a NAV Receiver, and a CDI. The RNAV has three basic modes of operation which are controlled by signals external to the RNAV: the VOR and RNAV modes are controlled by the selector switch on the DME which applies the VOR/RNAV signal to VOR/RNAV

switching, and the ILS mode is controlled by the ILS Energize signal from the NAV receiver. The operation of these modes is as follows.

## 4-4. RNAV Mode.

In the RNAV mode, the aircraft is flown toward a computed waypoint rather than the VORTAC, and the CDI shows the deviation from the selected course as distance rather than as angle as with conventional VOR operation. This requires two steps; the distance and direction from the waypoint (RNAV Vector) is computed, and then the deviation from the RNAV Vector to the course set into the OBS is computed.

- a. RNAV VECTOR - The Reference Sine Wave and Variable Square Wave are applied to the scalloping suppressor which suppresses undesirable phase changes. The resulting Smoothed Radial Square Wave is in phase with the Variable Square Wave, minus the undesirable changes. Therefore, the phase of the Smoothed Radial Square Wave represents the bearing from the VORTAC.

The Smoothed Radial Square Wave, together with the Analog Range from the DME, is applied to the VOR  $\pm 1$  gain amplifier. The square wave input determines the phase of the input VOR Vector, and the Analog Range input determines its amplitude. Thus, the output represents both the direction and distance from the VORTAC.

The waypoint bearing and distance are manually set into the RNAV front panel switches which applies parallel BCD signals to the waypoint circuits. The distance is converted to an analog voltage whose amplitude is proportional to the waypoint distance; the bearing is converted to a square wave whose phase represents the radial from the waypoint to the VORTAC. The resulting outputs are applied to the waypoint  $\pm 1$  gain amplifier which develops the Waypoint Vector in the same manner as the VOR Vector above.

The Waypoint and VOR Vectors are summed and filtered in the RNAV sum and filter circuits. This is directly analogous to adding two vectors, and the

resulting RNAV Vector signal represents the waypoint direction in phase, and the waypoint distance in amplitude. In the approach mode, the Enr/Appr signal increases the gain of the RNAV sum and filter circuits by a factor of 4 to provide greater sensitivity during approach.

- b. **DEVIATION** - The Reference Sine Wave is applied to the OBS resolver which shifts the phase of the sine wave to represent the course set in the OBS. The signal is then squared and applied to the L/R  $\pm 1$  gain amplifier through the VOR/RNAV switching logic. The RNAV Vector is applied to the remaining input of the amplifier. The amplitude of the RNAV vector determines the amplitude of the output L/R signal. The phase difference between the OBS Square Wave and the RNAV Vector determines what proportion of L/R will fall above and below the ground level. The output of the L/R amplifier is then averaged. If the OBS and RNAV Vector agree, equal portions of L/R fall above and below the ground level, and the averaged output is zero (0 x RNAV amplitude). Also, as the OBS and the RNAV Vector disagree, the averaged output is proportional to the product of the sine of the phase difference and the amplitude of the RNAV Vector (distance to waypoint). The resulting Left/Right signal is applied to the vertical pointer in the CDI.

#### 4-5. RNAV Digital Range.

In the RNAV mode, the distance to the waypoint (RNAV Range) is shown on the DME display. This is accomplished by rectifying and averaging the RNAV Vector into the RNAV Analog Range which controls the DVM. The DVM operates in a manner similar to a digital voltmeter inasmuch as the amplitude of the RNAV Analog Range determines the number of clock pulses that are gated through to the output (RNAV Digital Range).

DVM operation is initiated by the Xmtr Fired signal from the DME. Following this, the DME Clock (809 kHz) is gated, generating a RNAV Digital Range pulse burst with each pulse representing 0.1 nautical mile. These are applied to the DME which counts the number of pulses in the burst, and displays the resulting count.

#### 4-6. VOR Mode.

Switching the NAV Receiver to a VOR frequency with the DME function switch in the NAV position causes the RNAV to enter the VOR mode. In the VOR mode the aircraft is flown toward the VORTAC, and the CDI shows the angular difference between the VORTAC course and

the OBS. This is accomplished by exclusive-oring the OBS and Variable Square Waves in VOR/RNAV Switching and Gating. The resulting Difference signal is a square wave whose duty cycle is determined by the phase difference between the two inputs. If the OBS and VOR radials agree, there is a  $90^\circ$  phase difference between the OBS and Variable Square Waves, and the Difference signal has a 50% duty cycle. The difference signal is applied to one input of the L/R  $\pm 1$  gain amplifier, and a constant voltage is applied to the other input. This places the ground level of the L/R output at the center of the resulting square wave. A 50% duty cycle L/R then averages to zero output. Similarly, a duty cycle greater than 50% causes a positive average, and less than 50% causes a negative average. Thus, the resulting Left/Right signal represents both the angular difference and the left-right direction.

#### 4-7. Localizer Mode.

Switching the NAV Receiver to an ILS frequency with the DME function switch in NAV position causes ILS Energize to be applied to the Left/Right averager and output circuits which then routes the Loc L/R signal from the localizer through the Left/Right output circuits to the CDI. In the ILS frequency, the NAV Composite signal contains 90 and 150 Hz signals, representing left and right deviation from the glide path. These signals are demodulated and compared in the localizer, producing Loc L/R.

#### 4-8. FUNCTIONAL BLOCK DIAGRAMS.

##### 4-9. Computer/Converter A2.

Computer/Converter A2 (figure 4-2) demodulates the NAV composite input to provide the Reference and Variable signals, and contains the analog circuits required to compute the RNAV Vector and the deviation from the OBS course. It also contains the switching which provides for the three modes of operation: RNAV, VOR, and ILS.

- a. **REFERENCE AND OBS SIGNALS** - NAV Composite from the NAV receiver is applied to the 9960 Hz bandpass amplifier through the input buffer amplifier. The reference discriminator (figure 4-3) demodulates the 9960 Hz and applies the resulting 30 Hz Reference Sine Wave through the reference filter to the rotor of the OBS resolver. The rotor position corresponds to the OBS course; therefore, the phase at the stator outputs to the OBS squaring amplifier is changed in phase by the OBS angle. The shifted Reference signal is then squared and the resulting OBS Square Wave is applied to the To/From detector and EOR gate U24B.



**NOTE**

Do not attempt to measure exact phase differences except at the inputs to the L/R  $\pm 1$  gain amplifier and the To/From Detector. Design of the computer/converter requires that the OBS is displaced from the RNAV or Variable signals by  $90^\circ$  at these inputs for a 0 deviation output. This phase displacement is distributed throughout the assembly.

- b. **VARIABLE SIGNAL AND RNAV VECTOR** - The buffered NAV Composite is also applied through the VOR test circuits and 30 Hz bandpass amplifier to the variable squaring amplifier. The resulting Variable Square Wave is applied to VOR/RNAV switching and to the scalloping suppressor. The suppressor then applies the Smoothed Radial Square Wave to one input of the VOR  $\pm 1$  gain amplifier (figure 4-4) and the DME Analog Range is applied to the remaining input. The resulting VOR Vector is summed with the Waypoint Vector across R100 and R101. The sum is filtered and applied to the variable gain amplifier. The gain of this amplifier is controlled by the Enr/Appr signal from the RNAV front panel. In the approach mode (Enr/Appr = +15 V) the gain is 4 times greater than in the enroute mode.
- The phase of the RNAV vector represents the bearing from the waypoint and its amplitude represents the distance from the waypoint. In the RNAV mode this vector is applied through VOR/RNAV switching to the L/R  $\pm 1$  gain amplifier. The vector is also applied to the RNAV squaring amplifier which uses only the bearing information for To/From determination, and to the rectifier/averager which uses only the distance information to control the DVM.
- c. **RNAV MODE** - In the RNAV mode the VOR/RNAV signal from the DME = 0. VOR/RNAV switching then grounds one input of EOR gate U24B causing it to invert the OBS Square Wave. The OBS is again inverted and applied to the L/R gain amplifier. The RNAV Vector is routed through VOR/RNAV switching and a buffer to the remaining input of the amplifier. The resulting deviation is averaged and applied to the L/R output circuits which provides a two-ended output for the CDI vertical pointer.
- d. **VOR MODE** - In the VOR mode the VOR/RNAV signal from the DME = 1. VOR/RNAV switching

then applies the Variable Square Wave to EOR gate U24B. The OBS Square Wave is then exclusive-ored with the Variable Square Wave, producing an output whose duty cycle is proportional to the difference in the phases of the two inputs. This signal is inverted and applied to the L/R  $\pm 1$  gain amplifier. A constant voltage (approximately +1.25 V) is routed through the switching and buffer to the remaining input of the amplifier. The resulting deviation output (centered on ground level) is averaged and applied to the L/R output circuits which provide a two-ended output for the CDI vertical pointer.

- e. **ILS MODE** - In the ILS mode the ILS Energize signal from the NAV Receiver = 0. This signal is applied to the L/R outputs which then uses the Localizer L/R signal to provide a two-ended output to the CDI vertical pointer.
- f. **TO/FROM DETECTOR** - The CDI vertical pointer displays the right or left deviation from the course selected on the OBS. If, however, the OBS course is changed by  $180^\circ$ , the deviation amplitude remains the same, switching only from right to left or vice versa. Thus, the CDI vertical pointer centers for two OBS settings. To eliminate this ambiguity a To/From indication is required. This is provided by the To/From Detector which compares the OBS with either the RNAV Square Wave or the Variable Square. If the OBS phase lags the VAR phase by less than  $180^\circ$ , the To/From Detector drives the FROM output positive; if the OBS phase leads the VAR phase by less than  $180^\circ$ , the To/From Detector drives the TO output positive. These signals set the appropriate annunciator in the CDI.
- g. **FLAG LOGIC** - The flag logic checks that all necessary inputs are present for a given mode of operation and, if they are not, blanks the DME display (RNAV flag), disables the CDI vertical pointer ( $\Sigma$  flag), and sets the CDI annunciator to OFF (Vertical flag). Table 4-1 lists the conditions for these flags.
- h. **TEST CIRCUIT** - Placing the NAV Receiver in the test mode causes the VOR test circuits to route the Test Reference signal to the 30 Hz bandpass amplifier in place of the Variable. Thus, the Variable Square Wave agrees with the Reference which is equivalent to a  $0^\circ$  VORTAC bearing. In the VOR mode, a  $0^\circ$  OBS should center the CDI vertical pointer and set the To/From indicator to To.

The Test signal also disables the VOR  $\pm 1$  gain amplifier. Thus, the Waypoint Vector is substituted for



**TABLE 4-1. VERTICAL, RNAV, AND  $\Sigma$  FLAG CONDITIONS**

| Signal Inputs                      | Meaning                                                   |
|------------------------------------|-----------------------------------------------------------|
| ILS Energize = 0, Loc Flag = 1     | In ILS mode, but not receiving localizer signal.          |
| ILS Energize = 0, VOR/RNAV = 0     | In RNAV mode, but NAV receiver on ILS frequency.          |
| VOR/RNAV = 0, DME to RNAV Flag = 0 | In RNAV mode, but DME not tracking.                       |
| ILS Energize = 1, Omni Flag = 1    | In RNAV or VOR mode, but not receiving omni-range signal. |

the RNAV Vector. In the RNAV mode the vertical pointer centers when the OBS is set to the selected waypoint bearing. The DME display reads out the selected waypoint distance.

#### 4-10. Display A4.

Display A4 (figure 4-5) stores bearing and distance data for two waypoints. A third waypoint can be stored in the front panel mini-lever switches. The display provides the necessary logic to drive the front panel BEARING and DISTANCE display with the stored waypoint information as selected by the DISPLAY switch, and to provide the waypoint vector circuits with the stored waypoint information as selected by the FLY switch.

a. **STORING DATA IN MEMORY** - The memories require three inputs in order to store data: the data to be stored (Distance and Bearing), the memory address (Word 1 or Word 2), and the Write pulse. These inputs are applied as follows:

1. Bearing and Distance data, in BCD (Binary Coded Decimal) form are applied to the memory data inputs from the front panel BEARING and DISTANCE switches.
2. The front panel DISPLAY switch selects either Display 1 or Display 2. The resulting high is applied to the corresponding multiplexer which then gates either Word 1 (if Display 1 is high) or Word 2 (if Display 2 is high) to the address inputs of the memories. The memories can store 4 words, but only 2 are used in the RN-478A RNAV.
3. Pressing the front panel XFER switch causes the Xfer switch debouncer to gate the Write pulses to the memory Write inputs. These pulses write the data into the selected address.

b. **DISPLAYING MEMORY DATA** - Selecting either

Display 1 or Display 2 causes the memories to apply the selected stored waypoint through the buffers to the BCD to 7-segment decoders. The buffers are required in order to drive the TTL decoders. The decoders, in turn, drive the 7-segment displays providing a visual indication of the waypoint bearing and distance. The positive going pulse associated with Select Display is inhibited during a relatively brief period to permit multiplexing the Select Fly pulse. Data associated with the Select Fly pulse is of insufficient duration to be seen on the displays.

c. **SELECTING FLY MEMORY DATA** - Selecting either Fly 1 or Fly 2 causes the memories to apply the selected stored waypoint through the buffers to the distance and bearing latches. Select Fly is coincident with Word 1 or Word 2, as selected, and clocks the waypoint data into the latches. The output of the latches is then applied to the waypoint vector circuits.

d. **MATCH LOGIC** - This logic compares the Fly inputs with the Display inputs. If Fly and Display do not select the same word, the output of the flasher is applied to the front panel annunciator, providing a warning that the waypoint being flown to is not the one displayed.

e. **LAMP TEST AND OVERFLOW LOGIC** - This logic performs two functions:

1. With the DME receiver in the test mode, Test is 0 volt. This is applied to the test inputs of the decoder, enabling all used segments of the displays (DISTANCE = 188.8, BEARING = 888.8).
2. The five most significant bits of the bearing is sampled. If the bearing equals or exceeds  $360^\circ$ , the displays are also enabled as in test.

f. **KEEP-ALIVE CIRCUITS** - The bearing and distance

memories store data in flip-flops; therefore, the data are lost if power is removed. To prevent this, +28 V Aircraft Power is applied to the keep-alive circuits. With the RNAV on, RNAV 5 VDC provides B+ to the memories. With RNAV off, the +28 V is reduced to 5 VDC providing B+ to the memories.

#### 4-11. Waypoint Vector, Digital Processor A4.

The waypoint vector circuits (figure 4-6) convert the BCD Waypoint, Distance and Bearing to the Waypoint Vector signal whose amplitude represents the waypoint distance, and whose phase represents the waypoint bearing.

- a. **WAYPOINT DISTANCE** - The BCD Distance is applied through the Resistor network driver to the 3-decade BCD ladder network. The output of this network is a dc voltage proportional to the distance for 0-99.9 NM. An additional input sums the 100's digit to provide a signal proportional to the waypoint distance. This signal is then applied to the buffer and offset adjust circuits which provide the Analog Distance voltage to one input of the  $\pm 1$  gain amplifier. Full scale adjustment is provided by the  $V_{DD}$  adjustment, which controls the amplitude of the inputs to the resistor network driver.
- b. **WAYPOINT BEARING** - The Waypoint Bearing logic is initiated by the Load Pulse which is coincident with the Reference Square Wave. The Load Pulse loads the BCD bearing from the latches on the display board into the BCD Down Counter. The pulse also triggers the single-shot, which inhibits the  $.1^\circ$  Clock to the down counter during loading, and sets the restart flip-flop which insures that the logic is correctly initialized with the Waypoint Bearing signal at 1.

Following this, the BCD Down Counter is decremented by the  $.1^\circ$  Clock. There are 3600 clocks in one Reference Square Wave cycle, thus each clock represents a  $.1^\circ$  phase change, and the time required to decrement the down counter to zero is equal to the phase delay required. When the BCD down counter is decremented through zero,  $\overline{CO}$  (Carry Out) is set to 0, setting the R/S flip-flop, and resetting the 1800 counter to zero. The 1800 counter is then incremented by the  $.1^\circ$  Clock. At the 1800th clock (equal to  $180^\circ$ ), the counter resets the R/S flip-flop. A full cycle is produced by the following  $\overline{CO}$  from the down counter. Thus, the Waypoint Bearing Square Wave is displaced in phase from the reference square wave by the number of degrees in the input BCD Bearing.

When the Bearing approaches  $359.9^\circ$ , jitter may cause the Load Pulse to occur before the BCD Down Counter is decremented through zero. The counter would then be reloaded without generating a  $\overline{CO}$  output to set the R/S flip-flop, causing an output error. This is prevented as follows:

Each Load Pulse, after a delay by the single shot, sets the anti-jitter flip-flop which partially enables gate U41D. Normally, the flip-flop is reset by  $\overline{CO}$ . However, if the Load Pulse occurs before the counter is decremented through zero, the flip-flop is not reset, and gate U41D is fully enabled. This sets the R/S flip-flop via gate U44B and inverter U44A.

- c. **WAYPOINT VECTOR** - The Waypoint Bearing Square Wave is applied to the  $\pm 1$  gain amplifier, alternating the amplifier from +1 gain to -1 gain. The Analog Distance input is therefore alternated in phase and inverted, generating the Waypoint Vector whose phase represents the bearing from the VORTAC to the waypoint and whose amplitude represents the distance from the VORTAC to the waypoint.

#### 4-12. Scallop Suppressor, Digital Processor A4.

Scalloping is the result of phase changes between the Reference and Variable signals due to the effect of the environment at certain geographic locations. When uncorrected, it causes the CDI vertical pointer to fluctuate. The scallop suppressor reduces this effect by ignoring fast phase changes due to scalloping while accepting slow phase changes due to aircraft movement. This is accomplished by converting the phase difference between the Reference and Variable signals into a digital count. The count is stored and becomes the basic timing for the Smoothed Radial Square Wave which is approximately in phase with the input Variable Square Wave. The count is then incremented or decremented at a slow rate to follow changes between the Variable and Smoothed Radials, thus rejecting the faster scalloping changes.

Use of the digital count also permits compensation for the distance between the aircraft and VORTAC. An aircraft that is distant from the VORTAC receives relatively slow phase changes due to aircraft movement. As the aircraft approaches the VORTAC the changes become faster. This problem is solved by changing the digital count at a rate that is a function of the DME range.

- a. **BASIC TIMING** - The basic timing unit (figure 4-7) for phase measurement is generated by the phase-locked loop. This loop divides the 30 Hz Reference Square Wave into 3600 clocks, each representing



0.1°. During initialization, the clock counts from the leading edge of the Variable to the leading edge of the Reference Square wave is stored, and the output Smoothed Radial Square Wave is generated based on this count. This is followed by the normal mode of operation, during which the stored count is incremented or decremented so as to follow the input Variable signal. If the phase difference between the Reference and Variable signals approach 0°, the system operates in the slew mode. These modes of operation are as follows.

b. **INITIALIZATION** - Initialization requires any of the following conditions:

1. Loss of the NAV Omni signal which causes the Omni Flag to be 1.
2. A phase difference between the Smoothed Radial Square Wave and the Variable Square Wave greater than 20° which is detected by the 20° Difference Threshold Detector.

Any of the above partially enables gate U3B. The gate is fully enabled by the leading edge of the Variable Square Wave which triggers the initializing single-shot. The resulting Initialize signal accomplishes the following:

1. Loads Counter No. 1 with 3599 (359.9°). This count consists of logic 1's and 0's permanently wired into the data inputs of counter No. 1.
2. Sets the Digital Comparator so that the Up/Down = 0, causing counter No. 1 to count down.
3. Causes the clock gating to apply clocks to counter No. 1.
4. Changes the state of the 180° flip-flop. The purpose of this flip-flop will be discussed later. At this time it will be assumed that the resulting Invert signal = 1.

Following this, counter No. 1 is decremented by the clock until the positive-going edge of the Reference Square Wave triggers the load No. 2 single-shot. The resulting load No. 2 pulse temporarily inhibits the clock to counter No. 2, loads the count from counter No. 1 into counter No. 2, and sets the clock gating to inhibit application of clocks to counter No. 1. The count now contained in counter No. 1 is equal to 360° minus the phase difference between the Variable and Reference Square Waves.

Counter No. 2 is then decremented by the clock to zero. The following clock causes  $\overline{CO}$  (Carry Out) to set the output flip-flop, making the Smoothed Radial

= 0. It also resets the 900/1800 counter which counts the following 1800 clocks (180°). The counter then applies the 1800 signal to the output flip-flop, resetting the output flip-flop. The trailing edge of the Smoothed Radial is now coincident with the trailing edge of the Variable Square Wave, assuming no change or distortion in the Variable Square Wave.

- c. **NORMAL MODE** - On the following positive going transition of the Reference Square Wave, counter No. 2 is again loaded from counter No. 1,  $\overline{CO}$  sets the output flip-flop, and 1800 resets the output flip-flop as described above. The Variable Square Wave and Smoothed Radial are no longer more than 20° out of phase; therefore, Inhibit Timer = 0 which permits the suppression timer to be triggered by  $\overline{CO}$ . This causes the timer to clock counter No. 1, and then time out by a period determined by the DME Analog Range. The period is directly proportional to the range. For example, at a 5-mile DME range the timer will clock counter No. 1 every 5 cycles, and at 100-mile range the timer will clock the counter once every 100 cycles. Thus, as the aircraft nears the ground station and greater changes in bearing are possible, the timer provides a greater number of clocks to change counter No. 1.

The Up/Down mode of counter No. 1 is determined by the digital comparator in the following way. The comparator is a D type flip-flop that is clocked by  $\overline{CO}$ . The Variable Square Wave is applied to the D input. If the Variable Square Wave positive-going portion leads  $\overline{CO}$ , then 1 is clocked into the comparator making Up/Down = 0, which causes the counter to count down. Thus, the count will be smaller, and the next  $\overline{CO}$  will occur slightly earlier, correcting for the lead. Since  $\overline{CO}$  is coincident with the leading edge of the Smoothed Radial, the radial tracks the Variable Square Wave. Similarly, if the Variable Square Wave is lagging, the counter will count up.

- d. **SLEW MODE** - If the counters were permitted to change from 359.9° to 0° or vice versa, an output error would occur. This is prevented as follows:

The Limit decoder checks the binary outputs from counter No. 1 for 12.8° and 332.8°. If 12.8° is detected, the decoder sets the digital comparator for a counter No. 1 up count, and also sets the slew logic so that Slew = 1. Slew causes the clock gating to apply Clock x 2 to the counter, clocking it at twice the normal rate. Detection of 12.8° occurred when the counter was updated which is coincident with  $\overline{CO}$  which also resets the 900/1800 counter. After



900 normal clocks, the slew logic is reset. During this time counter No. 1 has been incremented by 1800 ( $180^\circ$ ). Slew has also triggered the  $180^\circ$  flip-flop which then inverts the Reference Square Wave (by means of EOR gate U1C) to compensate for the  $180^\circ$  change in count. Detection of  $332.8^\circ$  works in the same manner except that the counter is decremented.

#### 4-13. Localizer, DVM, and Dimmer A3.

Localizer, DVM, and Dimmer A3 (figure 4-8) contains three distinct circuits: the localizer circuits provide lateral ILS directional indications, the DVM converts the RNAV Analog Range into digital form that can be used by the DME, and the dimmer circuits control the brightness of the RNAV indicators in response to the Dimmer signal from the aircraft.

- a. LOCALIZER - With the NAV receiver tuned to an ILS frequency, the NAV Composite input signal consists of 90 Hz and 150 Hz, indicating left and right of the path to the runway. The composite signal is applied serially to two transformers tuned to 90 Hz and 150 Hz. A temperature compensated buffer maintains the transformers tuning by controlling the current through the primaries. The 90 Hz and 150 Hz signals are applied to level detectors which produce dc voltages (Right and Left) proportional to the amplitude of the inputs. The right and left signals are applied to the differential amplifier which provides the Localizer L/R signal to the computer converter. The left and right signals are also applied to the summing amplifier and comparator which com-

pares the sum of the signal to a fixed voltage. If the sum of the signals are not of the specified amplitude, the LOC flag output is set to 1.

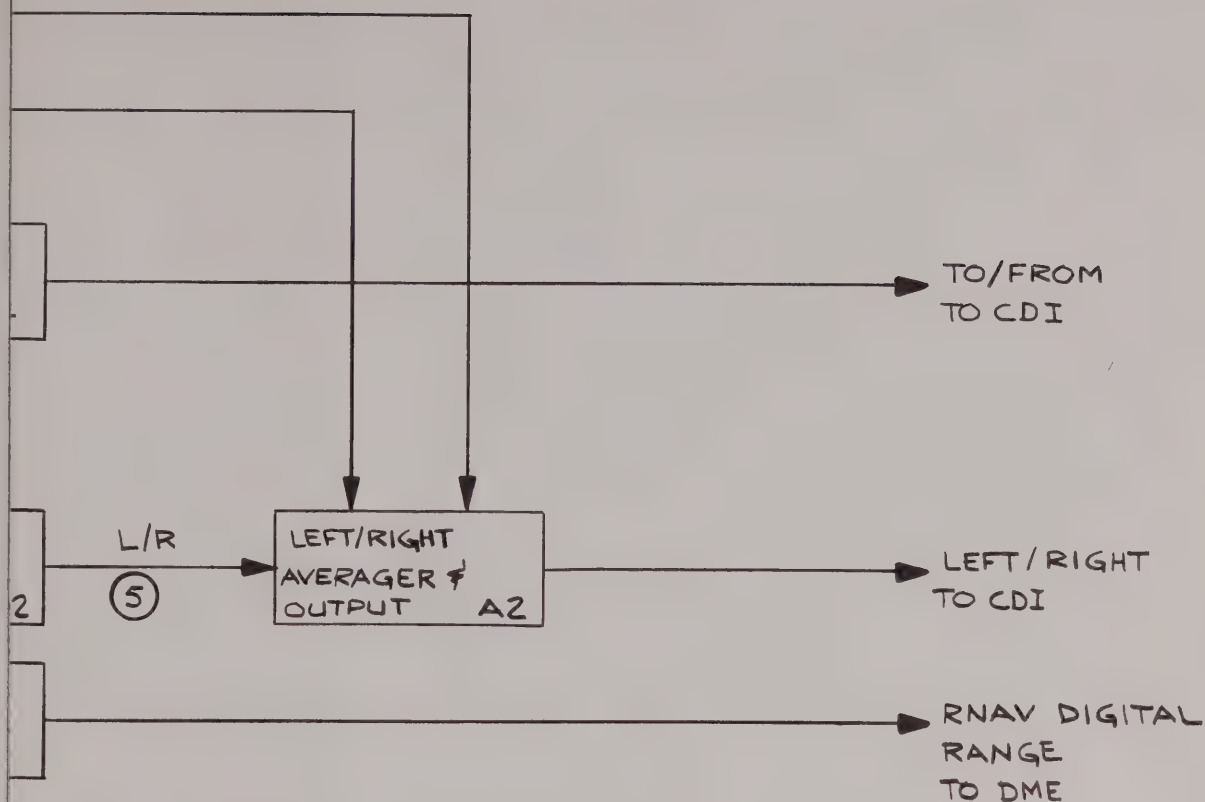
- b. DVM - This circuit gates DME clocks from the start of a linear ramp signal until the ramp exceeds the amplitude of the RNAV Analog Range input. Thus, the Analog Range, whose amplitude is proportional to the range, determines the number of DME clocks gated, whose number is also proportional to the range. This is accomplished as follows:

The Xmtr Fired pulse from the DME sets the R-S flip-flop, which then triggers the ramp generator and also enables the clock gating which gates the clocks to the RNAV Digital Range output. (It is assumed that the DME is ready to process the range, in which case Count Enable is 1.)

The comparator compares the Ramp with the filtered RNAV Analog Range signal from the computer converter. When the amplitude of the Ramp exceeds the amplitude of the range, the comparator resets the R-S flip-flop which inhibits further gating of the clocks.

- c. DIMMER - The RNAV uses +8 volts from the DME as a dimmer supply for the display and annunciator. The amplitude of the dimmer supply tracks the amplitude of the 28 volt Dimmer from the aircraft, thus permitting all displays to be controlled from a common source. If the 28 volt Dimmer signal is removed (open), the Dimmer Supply will go to maximum amplitude.





VOR MODE  
 COMPUTING ANGULAR DIFFERENCE BETWEEN  
 OBS & VARIABLE (0 DIFFERENCE SHOWN)





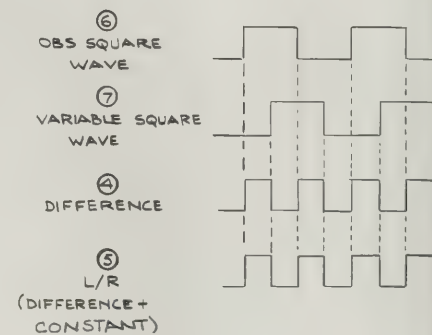
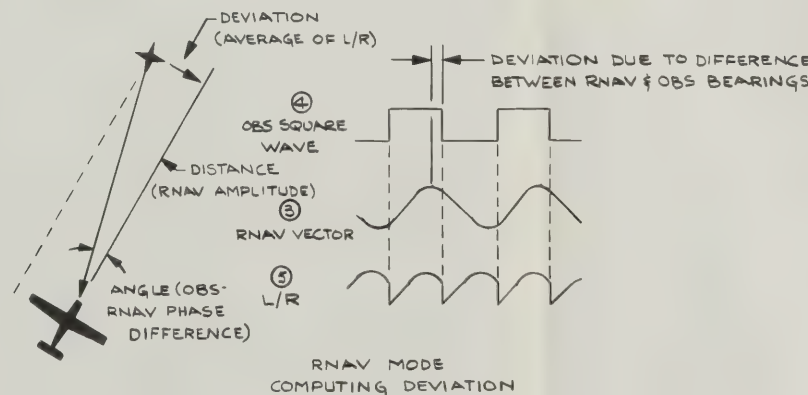
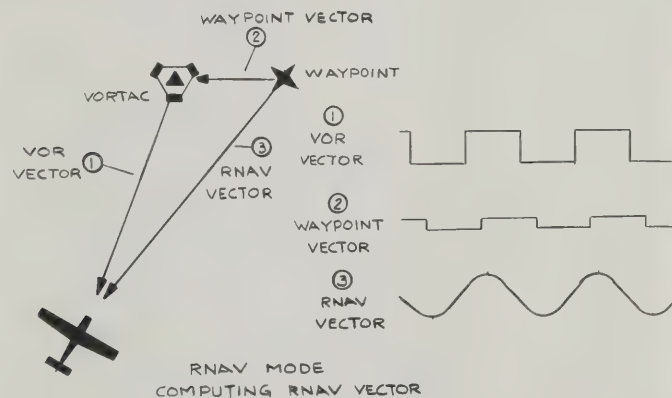
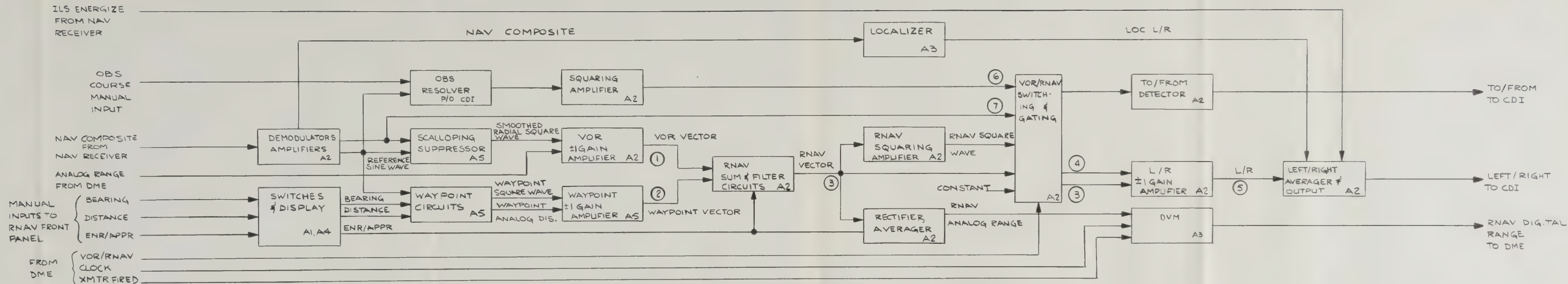
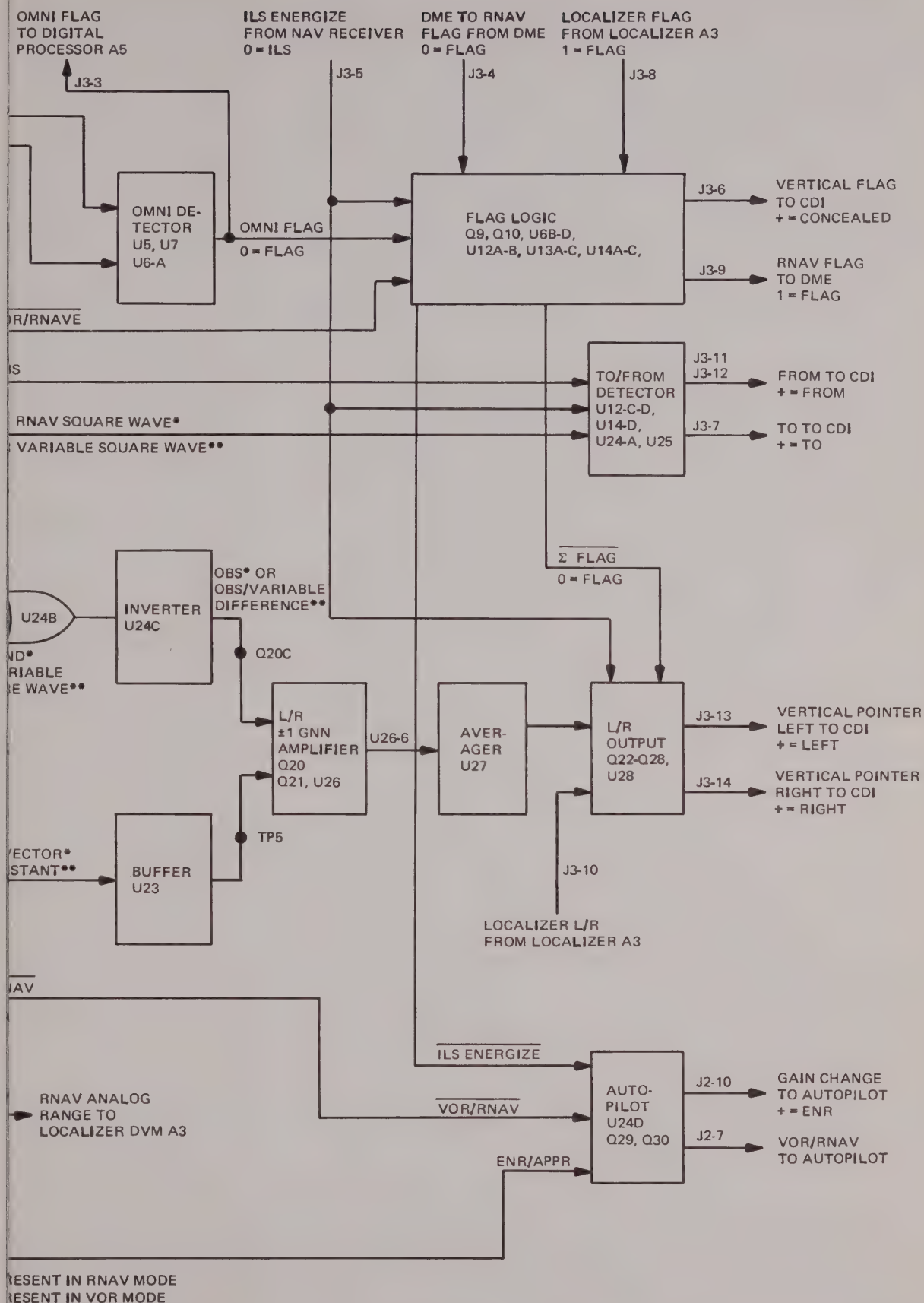


Figure 4-1. RNAV Principles







0383-1-9

Figure 4-2. Computer/Converter A2, Functional Block Diagram



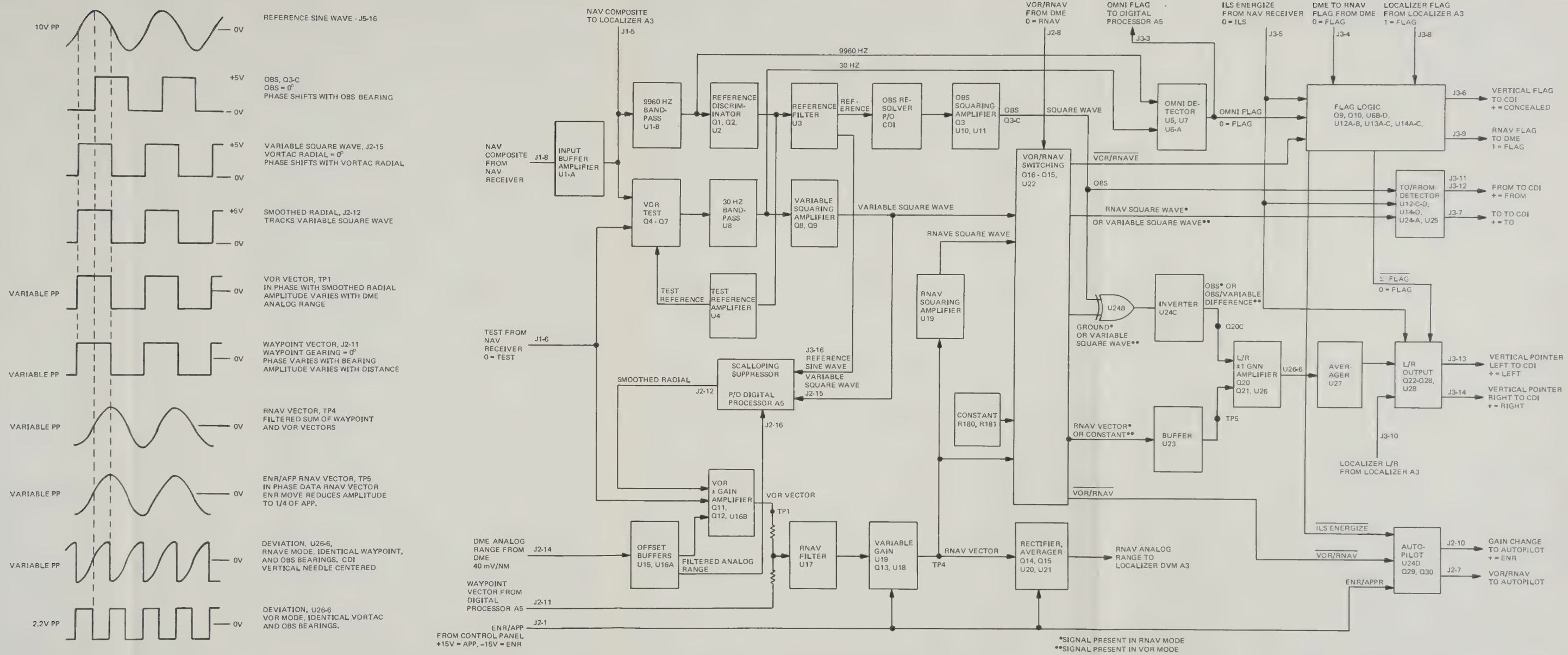
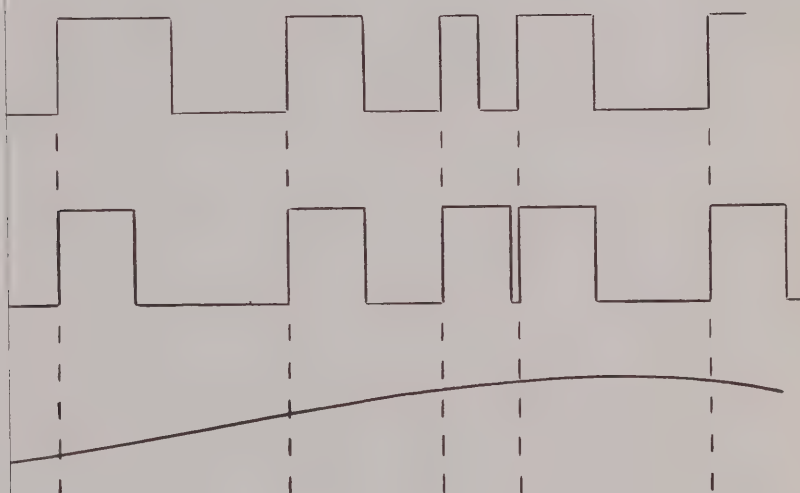
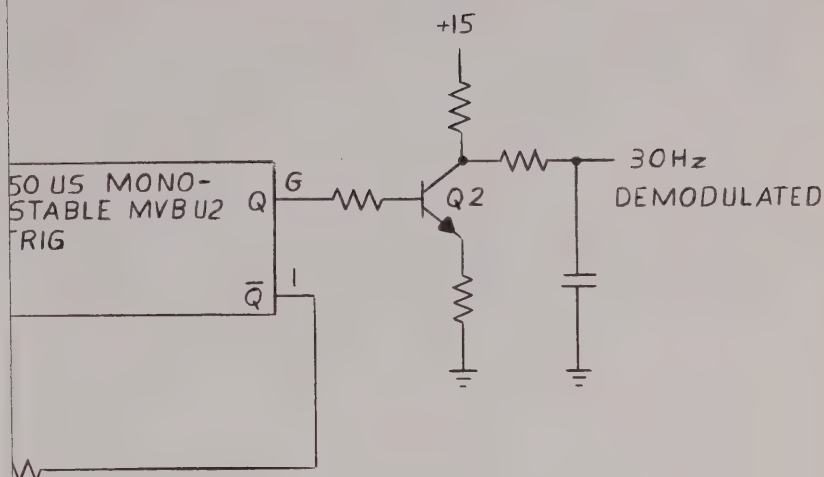


Figure 4-2. Computer/Converter A2, Functional Block Diagram





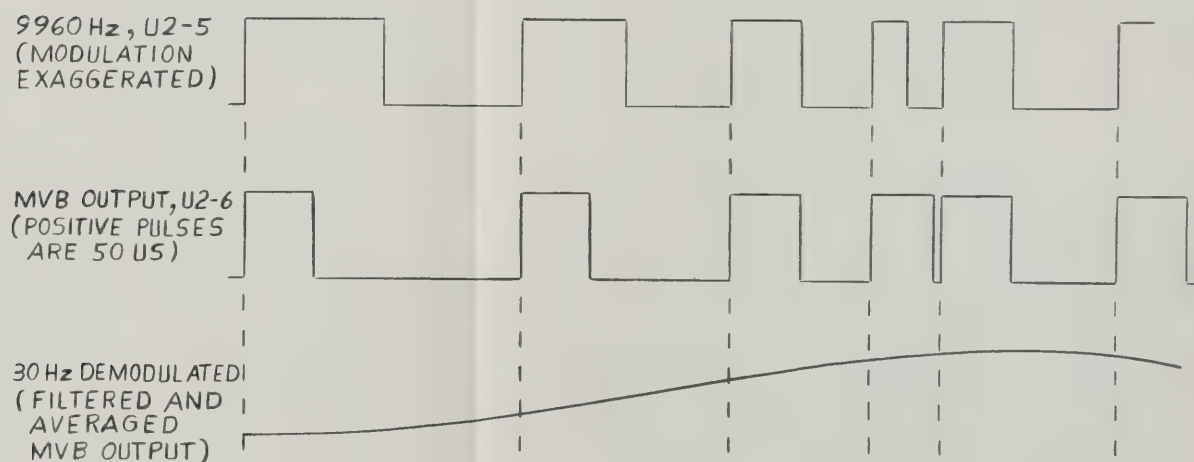
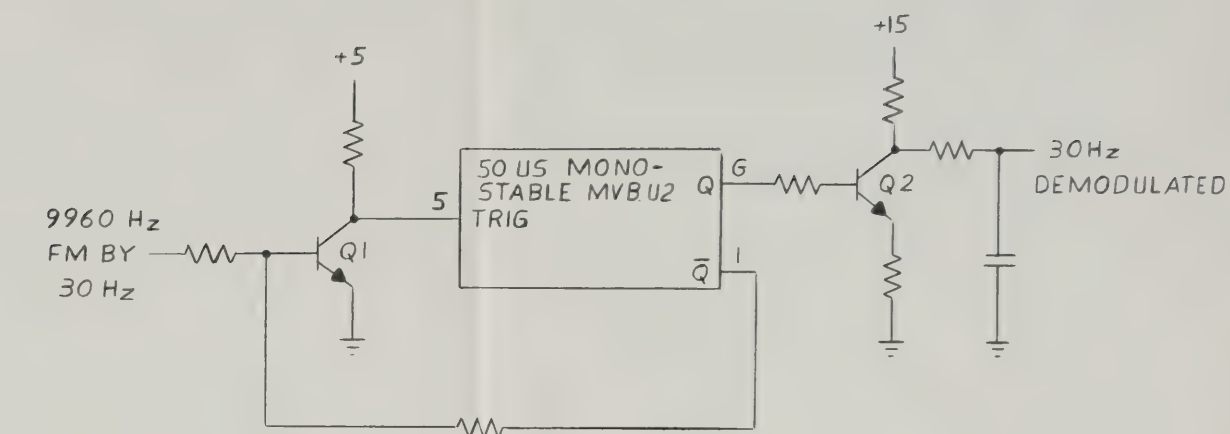


DURING TRANSITION OF 9960Hz TRIGGERS  
 IT CONSTANT 50 US PULSE, THUS  
 CLE VARIES WITH FREQUENCY MODULATION.

0383-1-10

Figure 4-3. Reference Discriminator,  
 Functional Block Diagram

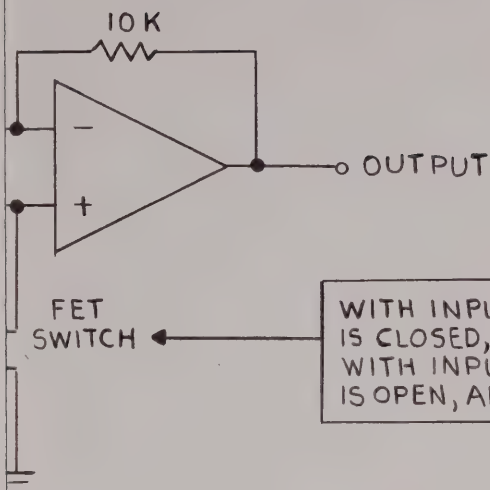




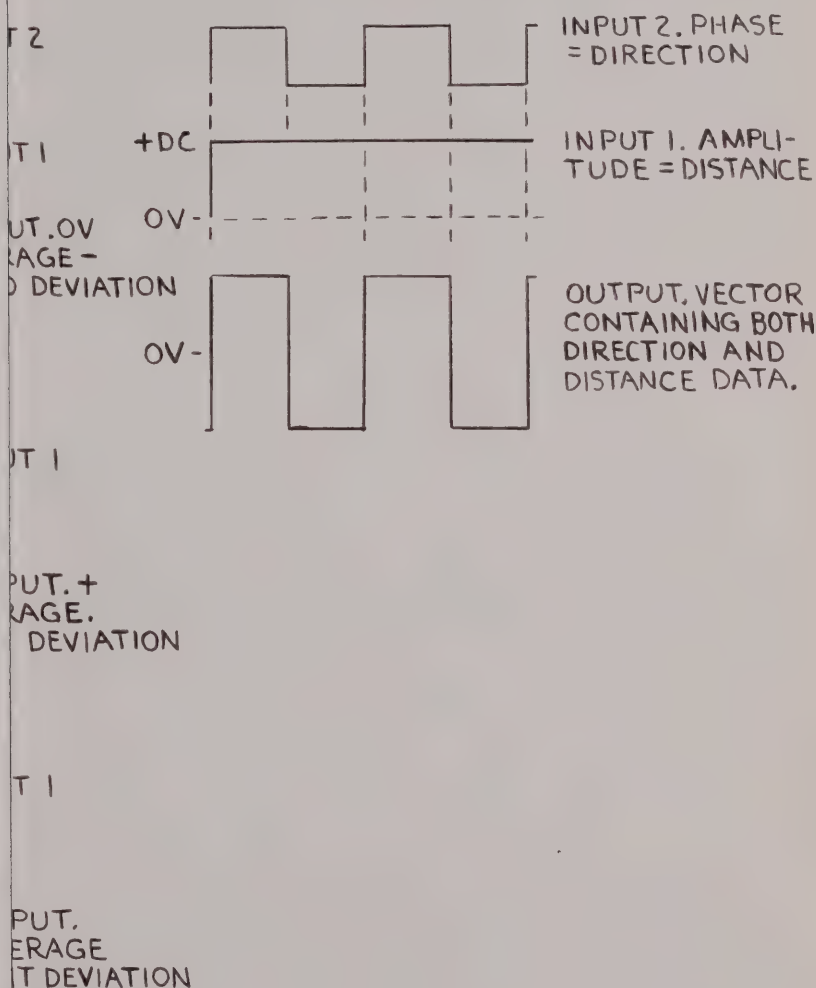
EACH POSITIVE GOING TRANSITION OF 9960 Hz TRIGGERS MVB. MVB OUTPUT CONSTANT 50 US PULSE, THUS OUTPUT DUTY CYCLE VARIES WITH FREQUENCY MODULATION.







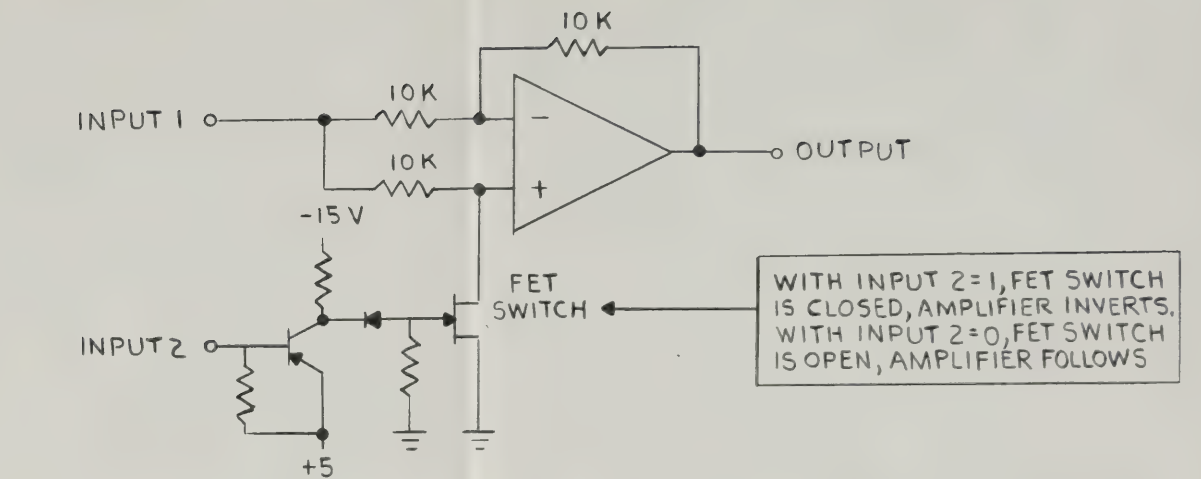
# VOR AND WAYPOINT $\pm$ GAIN AMPLIFIER WAVE FORMS



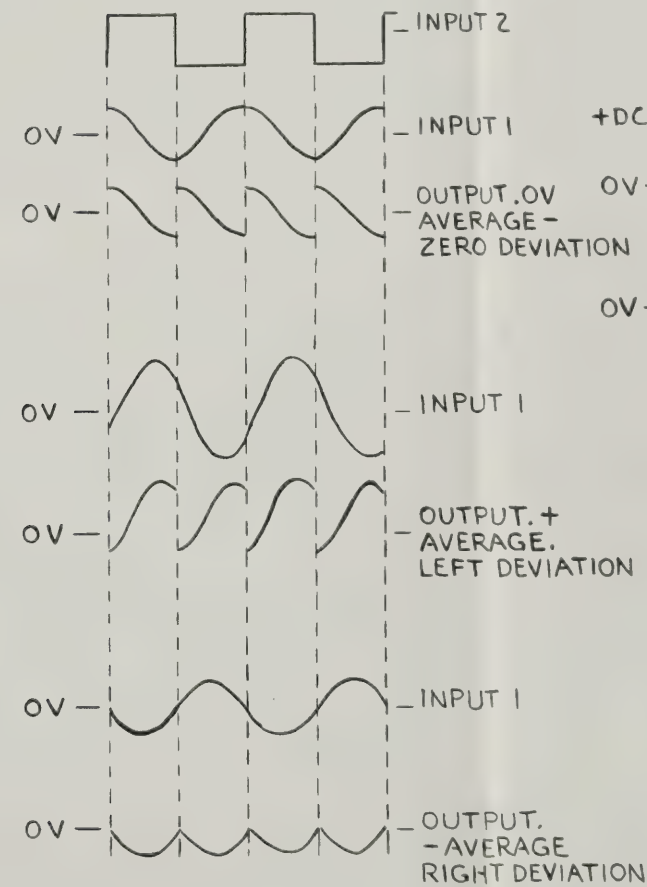
0383-1-11

Figure 4-4.  $\pm 1$  Gain Amplifier, Functional Block Diagram

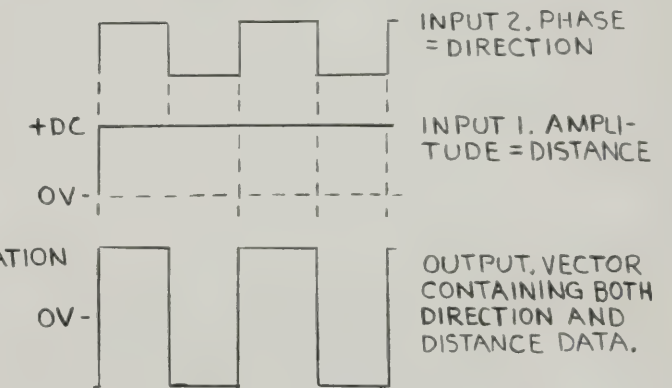




L/R  $\pm 1$  GAIN AMPLIFIER WAVEFORMS (RNAV MODE)

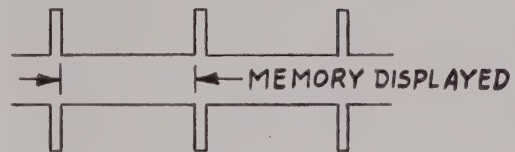


VOR AND WAYPOINT  $\pm$  GAIN AMPLIFIER WAVEFORMS



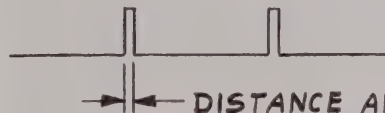






SELECT FLY,  
WORD 1 OR WORD 2

SELECT DISPLAY,  
WORD 1 OR WORD 2



WRITE (XFER BUTTON  
PRESSED)

NT  
IGITAL  
OR A5

CE

DINT  
IGITAL  
OR A5



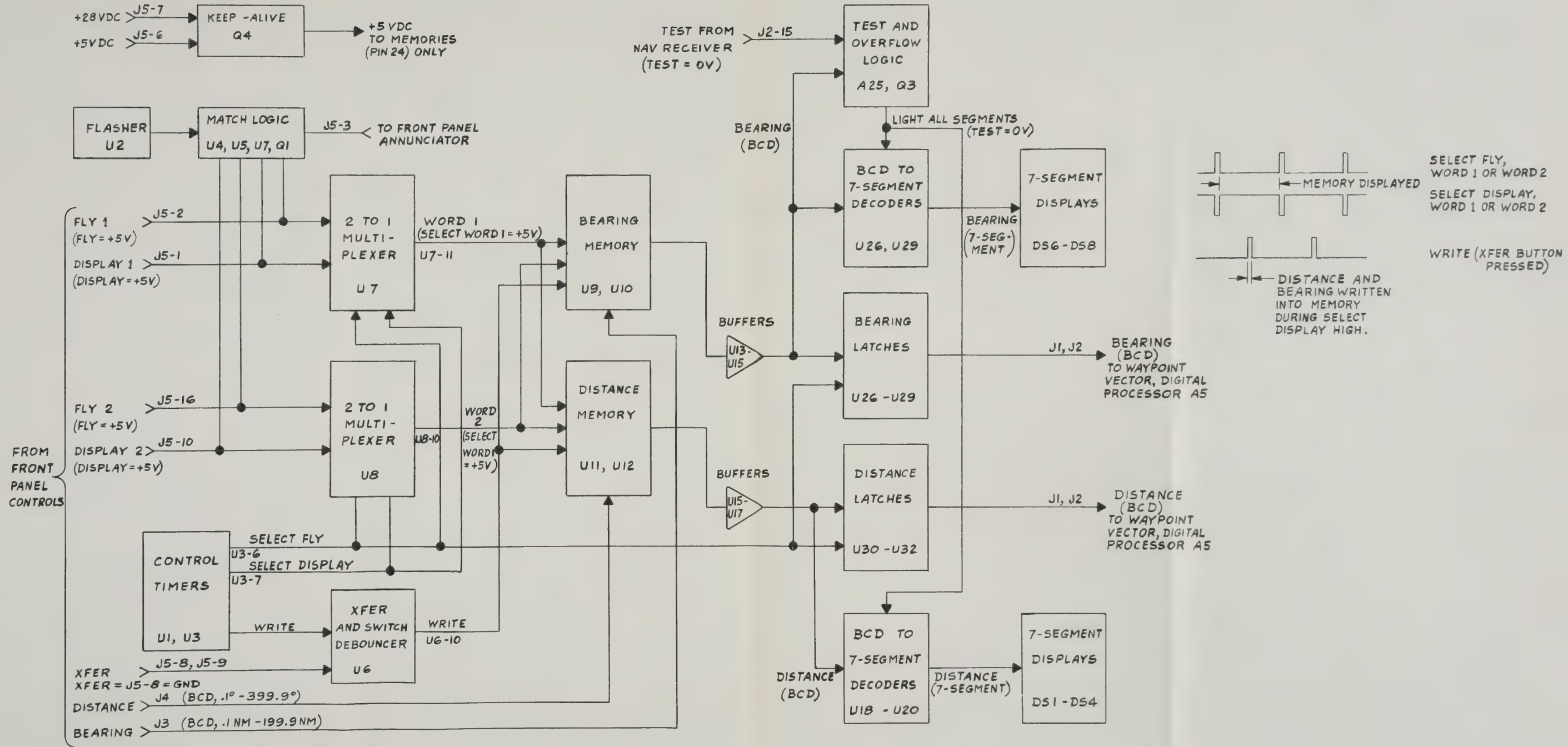
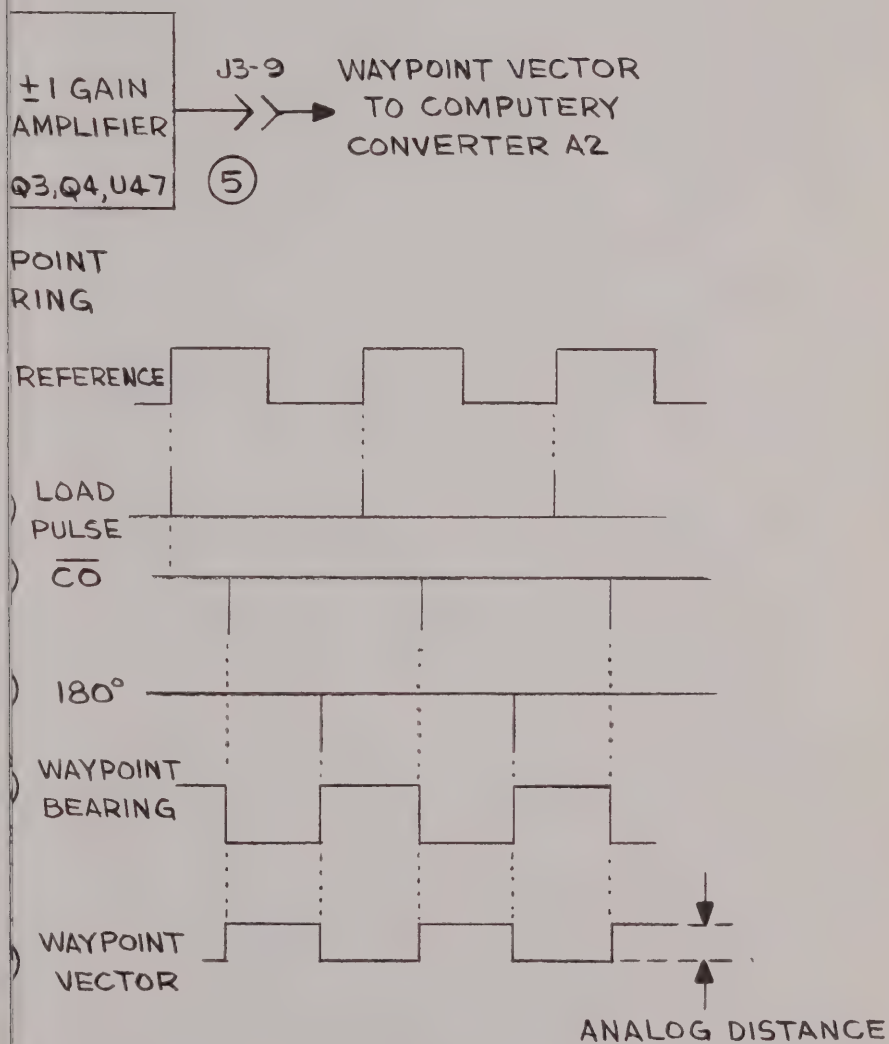


Figure 4-5. Display A4, Functional Block Diagram







0383-1-38

Figure 4-6. Waypoint Vector, Digital Processor A5, Functional Block Diagram



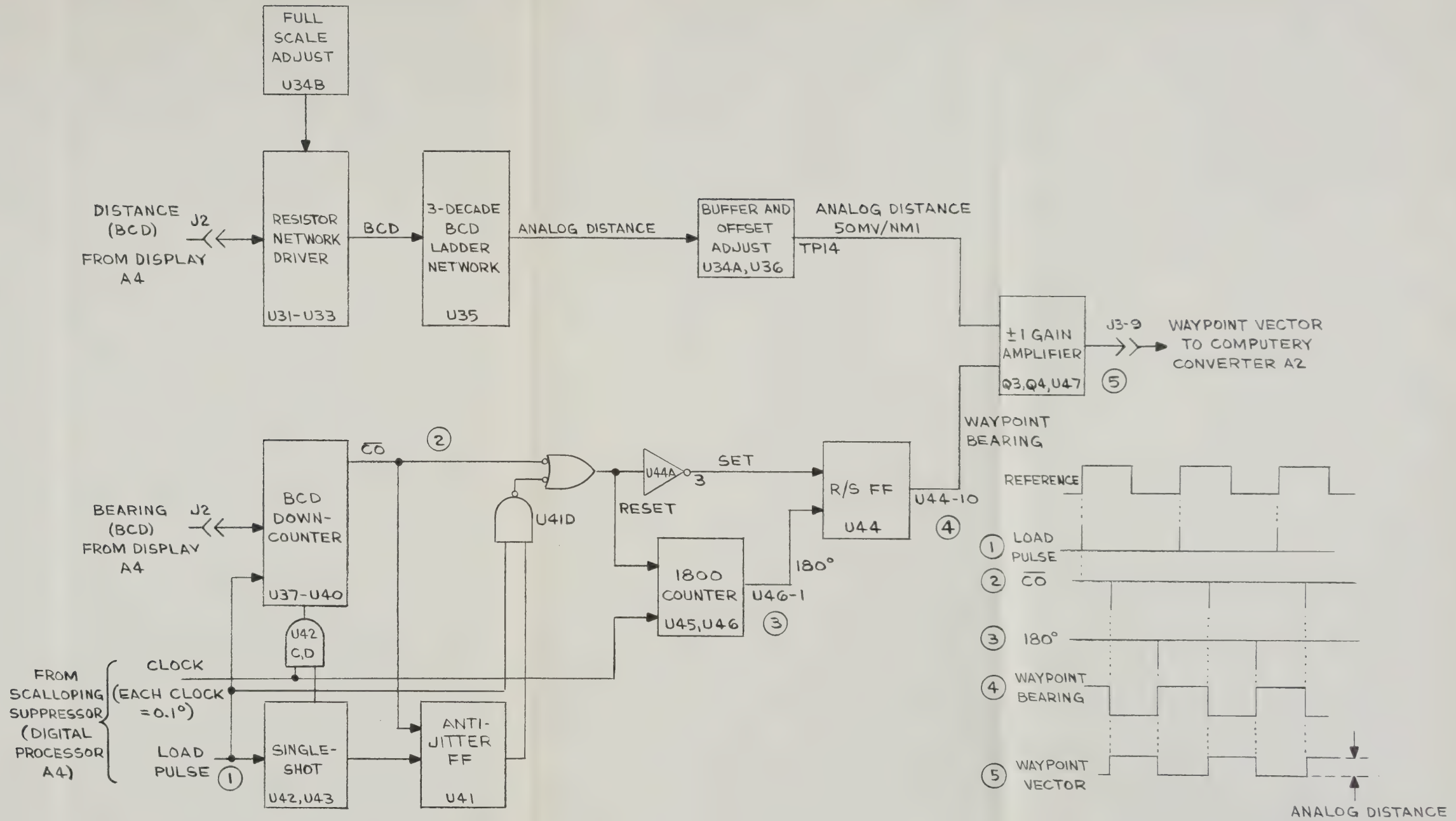
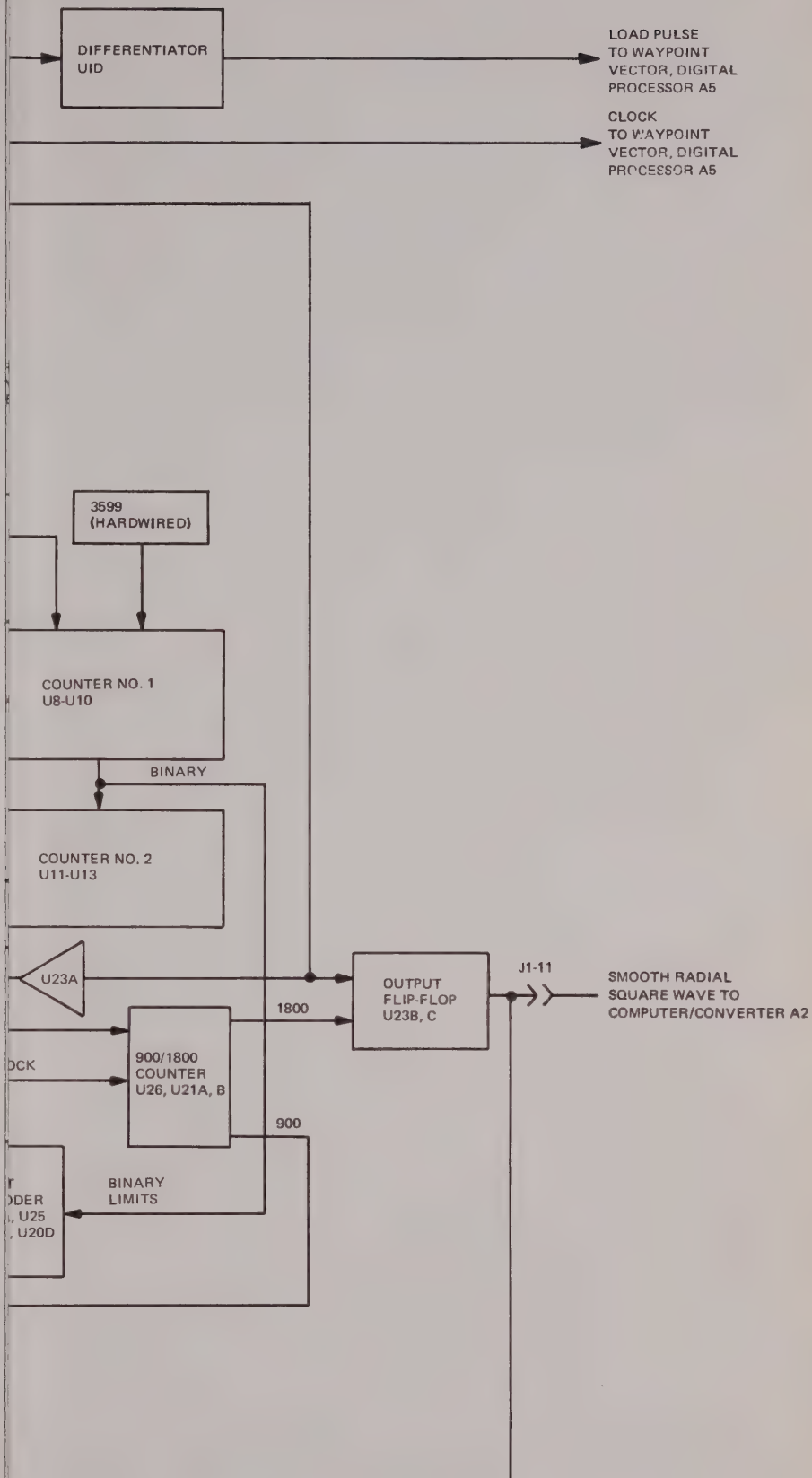


Figure 4-6. Waypoint Vector, Digital Processor A5, Functional Block Diagram







0383-1-39

Figure 4-7. Scalping Suppressor, Digital Processor A5, Functional Block Diagram



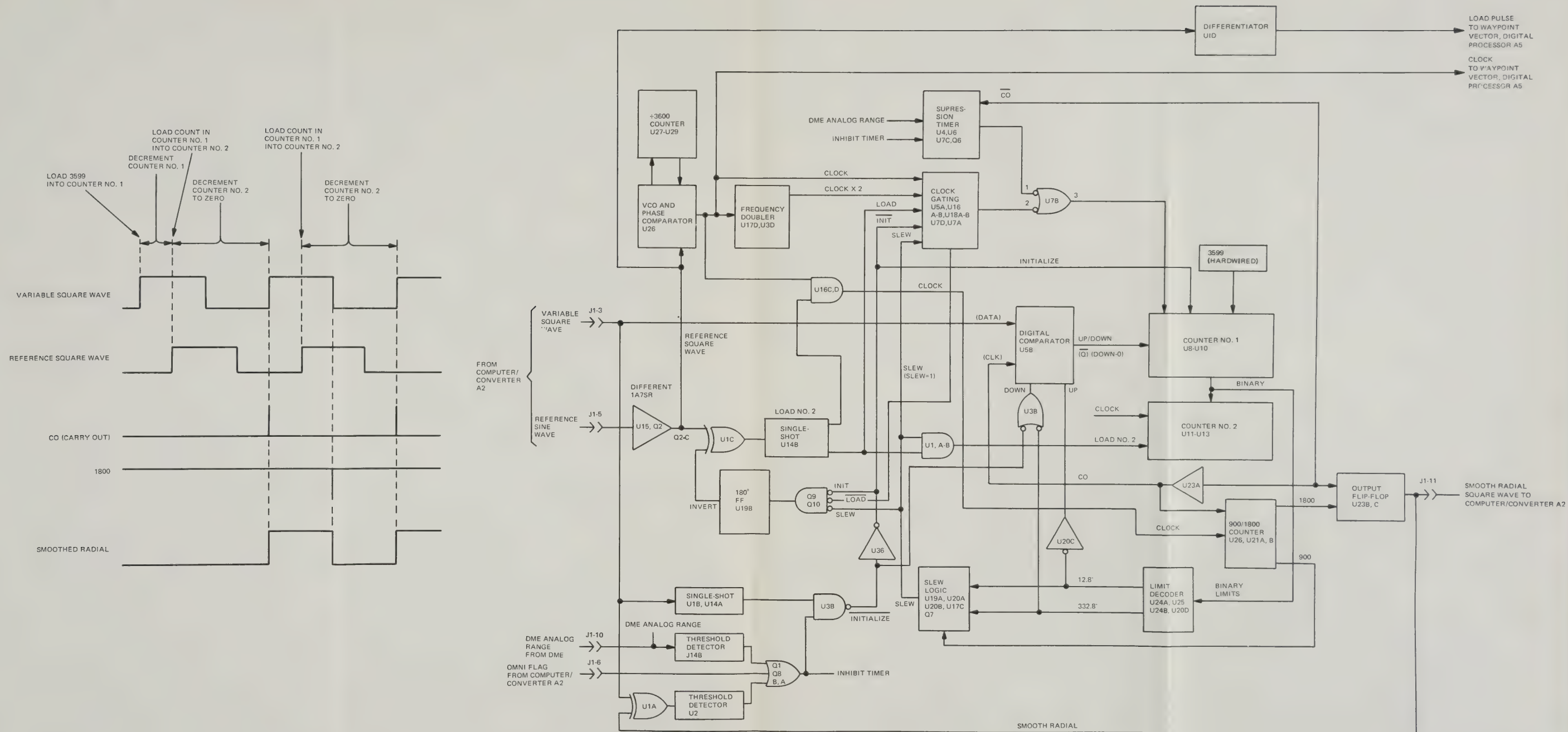
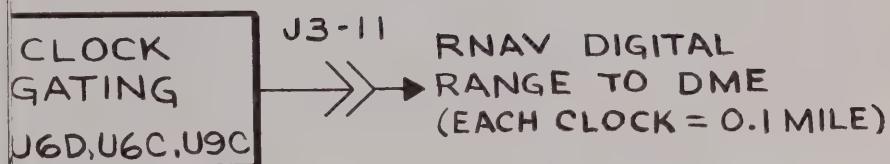


Figure 4-7. Scallop Suppressor, Digital Processor A5, Functional Block Diagram







ONVERTER A2  
- = LEFT,

ONVERTER A2

0383-1-40

Figure 4-8. LOC, DVM, Dimmer A3,  
Functional Block Diagram



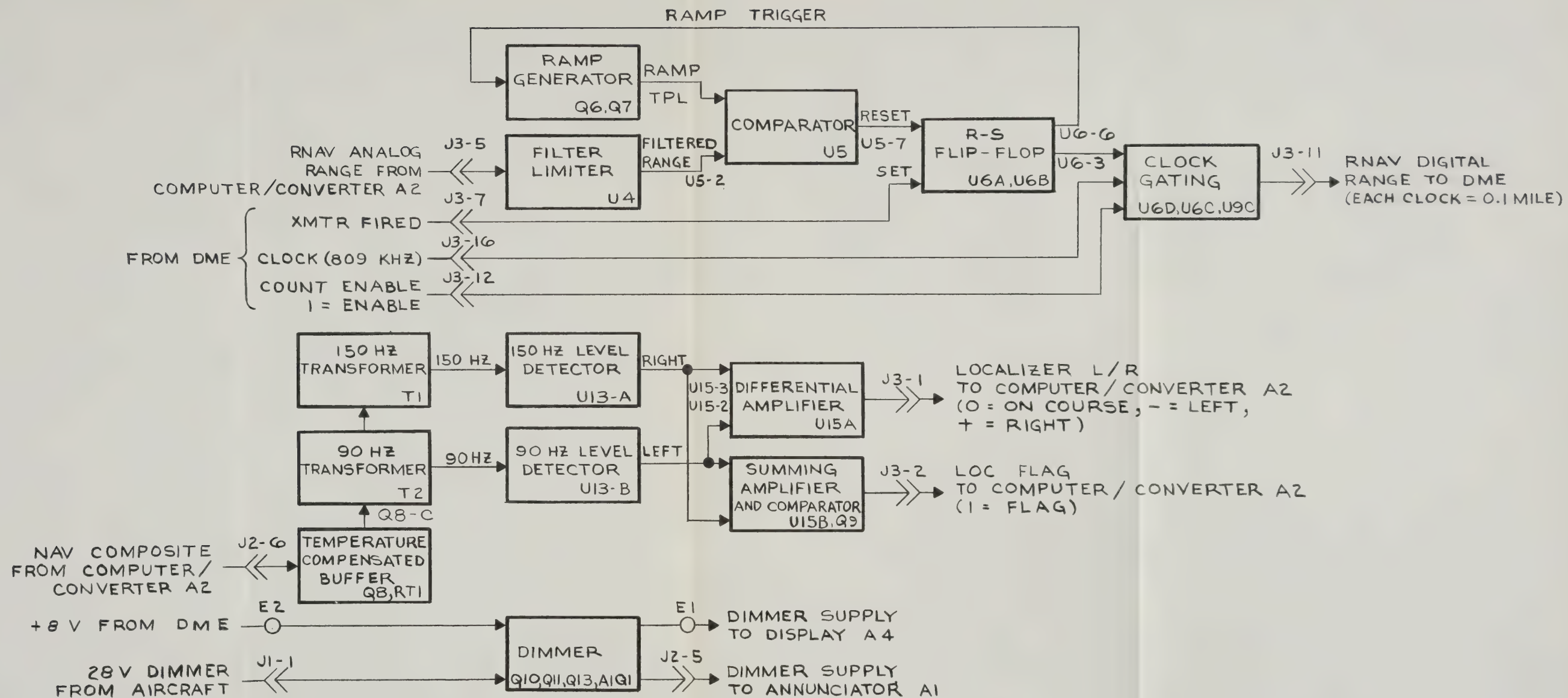


Figure 4-8. LOC, DVM, Dimmer A3, Functional Block Diagram





## SECTION 5

### MAINTENANCE

#### 5-1. INTRODUCTION.

The following maintenance information for the RNAV includes all required test and adjustment procedures. Special test equipment required for maintenance are listed in Section 1. The maintenance instructions include both bench test alignment for the RNAV as a unit and individual subassembly alignments.

#### 5-2. TEST SETUP.

- a. Connect RNAV to auxiliary equipment in accordance with figure 2-2.

#### CAUTION

Set the power supply ON/OFF switches to the OFF position and set the voltage control knobs to the minimum voltage settings.

- b. Connect the three power supplies, the NAV (IFR NAV 750) test set and the DME (IFR 1200 Y3) test set in accordance with figures 2-2 and 5-1.
- c. Set switches and/or controls in accordance with table 5-1.
- d. Note the current drain on the NAV power supply ammeter. It shall be less than 1.0 amp.
- e. Remove the top and bottom covers of the RNAV and using the DVM, make the following measurements on board A5 relative to ground. (A convenient ground point is U40, pin 5.)

#### NOTE

Refer to Section 7 for location of printed circuit boards and Section 6 for location of components on printed circuit boards.

| COMPONENT | TERMINAL | READING         |
|-----------|----------|-----------------|
| A5U40     | pin 16   | + 5.0 ± 0.2 Vdc |
| A5U36     | pin 7    | +15.0 ± 0.6 Vdc |
| A5U36     | pin 4    | -15.0 ± 0.6 Vdc |

- f. Decrease the voltage of RNAV dimmer power supply HP6215A. Observe RNAV illumination. As the voltage decreases, the brightness shall decrease until 0 volts is reached. At 0 volts the brightness shall suddenly increase to maximum. The light intensity shall be evenly distributed for all voltages.

#### NOTE

Waypoint data is represented as (XXX.X/YYY.Y) where XXX.X represents distance and YYY.Y represents bearing. To enter the waypoint data; adjust the minilever switches to reflect the values given, set the FLY 1/2 and DSPL 1/2 switches to the same number (1 or 2) and press the XFER switch. Check that the data entered into memory is displayed on the incandescent display.

- g. Set RNAV switches as in accordance with table 5-2.

#### NOTE

Set NAV test set and VHF navigation receiver to any convenient VOR, or localizer (ILS), frequency as required. A VOR frequency must be used in RNAV mode.

- h. Set NAV (IFR NAV 750) and DME (IFR 1200 Y3) test set switches and controls in accordance with table 5-3.

TABLE 5-1. INITIAL SWITCH POSITIONS

| UNIT                | SWITCH OR CONTROL | POSITION OR SETTING |
|---------------------|-------------------|---------------------|
| Power Supplies      | ON/OFF            | ON                  |
| Power Supplies      | Output voltage    | 27.5 ± 0.3 Vdc      |
| DME Control Unit    | ON/OFF            | ON                  |
| DME Control Unit    | Select switch     | RNAV                |
| Navigation Receiver | Power switch      | ON                  |
| Navigation Receiver | Frequency         | 108.00              |

TABLE 5-2. RNAV INITIAL SWITCH POSITIONS

| RNAV Switch | Position   |
|-------------|------------|
| ENR/APPR    | ENR        |
| DSPL 1/2    | 1          |
| FLY 1/2     | 1          |
| Waypoint    | 00.0/000.0 |

TABLE 5-3. TEST SET SWITCH POSITIONS

| Test Set | Switch                                               | Position                                      |
|----------|------------------------------------------------------|-----------------------------------------------|
| DME      | POWER<br>DISTANCE<br>RF LEVEL<br>FREQ                | ON<br>20 Nautical Miles<br>-67 dBm<br>108.00  |
| NAV      | POWER<br>BRG Selector<br>TO/FROM<br>RF LEVEL<br>FREQ | ON<br>0°<br>TO<br>-67 dBm (1000 μV)<br>108.00 |

### 5-3. PRELIMINARY ADJUSTMENTS.

The following adjustments insure that the DME provides the correct range display with a given RNAV Analog Range input to the RNAV DVM. It should be performed before making any adjustments which require using the DME range display.

- Step 1. Set all switches and controls in accordance with tables 5-1, 5-2 and 5-3.
- Step 2. Connect the DVM to J3-5 and J3-6 (located on board A3).
- Step 3. Adjust the DME test set and/or waypoint (on RNAV) until  $200 \pm 1$  mV is read on DVM.
- Step 4. Adjust R17 (on board A3) until  $5.0 \pm 0.1$  nautical miles is read on DME Control Unit.
- Step 5. Adjust the DME test set and/or waypoint until  $1600 \pm 1$  mV is read on DVM.
- Step 6. Adjust R24 (on board A3) until  $40.0 \pm 0.1$  nautical miles is read on DME Control Unit.
- Step 7. Repeat steps 3 through 6 until all criteria are met.

### 5-4. OVERALL RNAV ALIGNMENT.

This overall alignment must be performed after making any repairs, replacements, or adjustments of the RNAV.

### 5-5. Omniconverter Alignment.

#### NOTE

Prior to performing alignment, ascertain that switches and controls are set in accordance with tables 5-1, 5-2, and 5-3, with the following exception:

DME ON/OFF switch | OFF position

- Step 1. Using DVM, measure  $1.23 \pm 0.01$  Vdc between TP5 and TP6. Adjust R182 if necessary.
- Step 2. Set OBS to  $060^\circ$ .
- Step 3. Connect DVM between J3-13 and J3-14 on board A2 (vertical needle + left and vertical needle + right, respectively).

- Step 4. Set NAV test set bearing selectors to  $060^\circ$ /FROM.
- Step 5. Adjust R56 (on board A2) to obtain a reading of  $0 \pm 5$  mVdc. Record the DVM reading.
- Step 6. Set NAV test set TO/FROM switch to TO.
- Step 7. Adjust R56 (on board A2) to obtain the average of the readings in accordance with steps 5 and 6. Note this reading.
- Step 8. Set NAV test set TO/FROM switch to FROM. Note the DVM reading.
- Step 9. Calculate the difference between the readings obtained in steps 7 and 8.
- Step 10. If the difference, calculated in step 9, exceeds 2.00 mV, adjust R56 (on board A2) to obtain the average of the readings of steps 7 and 8.
- Step 11. Repeat steps 9 and 10 until the difference is not exceeded.
- Step 12. Set NAV test set TO/FROM switch to FROM.
- Step 13. Adjust R138 (on board A2) to obtain a reading of  $0 \pm 1$  mV.
- Step 14. Set OBS to  $150^\circ$ .
- Step 15. Set NAV test set bearing selectors to  $150^\circ$ .
- Step 16. Adjust R27 (on board A2) to obtain a reading of  $0 \pm 3$  mV for both TO and FROM.
- Step 17. Toggle NAV test set TO/FROM switch slowly. Ascertain that  $0 \pm 3$  mV is not exceeded in either position. Adjust R27 (on board A2) as necessary.
- Step 18. Set OBS to  $060^\circ$ .
- Step 19. Set NAV test set TO/FROM selectors alternately to  $060^\circ$ /FROM and  $060^\circ$ /TO.
- Step 20. Adjust R56 to obtain a reading of  $0 \pm 3$  mV in both (TO and FROM) positions.
- Step 21. Set the OBS and navigation test set bearing selector to the settings listed below. Toggle the navigation test set TO/FROM switch slowly



and note the voltage reading for each setting.  
 000°, 030°, 060°, 090°, 120°, 150°, 180°,  
 210°, 240°, 270°, 300°, and 330°.

Step 22. No reading shall deviate more than  $\pm 10$  mV from any other reading.

Step 23. Set OBS to 000°.

Step 24. Set NAV test set bearing to 090.0°.

Step 25. Hold VHF navigation receiver (momentary ON) TEST switch in TEST position.

Step 26. Adjust R46 to obtain reading of  $0 \pm 7.5$  mV.

Step 27. Release navigation receiver test switch.

Step 28. Set NAV test set 30 Hz tone level to 0% modulation.

Step 29. Adjust NAV test set 9960 Hz tone level to obtain  $0.14 \text{ VRMS} \pm .005 \text{ VRMS}$  of 9960 Hz tone at receiver NAV OUT.

Step 30. Set 30 Hz tone to 40% modulation.

Step 31. Adjust R67 so that unit flags between .13 and .15 VRMS of 9960 Hz when varying from a high to a low level.

Step 32. Verify that unit remains flagged for any level lower than .13 VRMS.

Step 33. Set 9960 Hz tone level to 40% modulation.

Step 34. Set 30 Hz tone level to 20% modulation.

Step 35. Adjust R72 so that unit flags between 19% and 21% modulation.

Step 36. Verify that unit remains flagged for all 30 Hz tone levels lower than 19% modulation.

Step 37. Return both modulation levels to 30%.

#### 5-6. Computer Alignment.

Step 1. Set switches in accordance with tables 5-1, 5-2, and 5-3 with the following exceptions:  
 NAV test set bearing selector to 060°/FROM,  
 NAV test set to VOR frequency, OBS to 060°

Step 2. Check that DME has ranged to  $20.0 \pm 0.1$  nautical miles.

Step 3. Set DME to RNAV mode.

Step 4. Adjust R117 (on board A3) until CDI vertical needle is centered ( $\pm 1$  division), i.e.  $\pm 30$  mV between A3J3-13 and A3J3-14.

Step 5. Connect DVM between TP14 and the grounded side of R40 (on board A5).

Step 6. Adjust R43 (on board A5) to obtain a reading (on DVM) of  $0.0 \pm 1.0$  mVdc.

Step 7. Set RNAV DSPL 1/2 switch and FLY 1/2 switch to 2 and enter waypoint: 50.0/000.0.

Step 8. Adjust R33 to obtain a (DVM) reading of  $2.500 \pm 0.002$  Vdc.

Step 9. Set both RNAV DSPL 1/2 switch and FLY 1/2 switch to 1.

Step 10. Monitor U47-6, relative to ground, with oscilloscope. Use the 10 mV/DIV scale.

Step 11. Adjust R43 until 30 Hz squarewave at U47-6 is less than 2 mV peak to peak.

Step 12. Enter RNAV waypoint: 01.0/000.0.

Step 13. Hold VHF navigation receiver TEST switch in TEST position.

Step 14. Adjust R171 (on board A2) until 1.0 nautical mile is read on DME display.

Step 15. Enter RNAV waypoint: 91.0/000.0.

Step 16. Adjust R168 (on board A2) until 91.0 nautical miles are read on DME display.

Step 17. Repeat steps 12 through 16 until no additional adjustments are necessary to obtain the 1.0 and 91.0 nautical mile readings on the DME display.

Step 18. Set RNAV ENR/APPR switch to APPR.

Step 19. Set both RNAV DSPL 1/2 switch and FLY 1/2 switch to 2.

Step 20. Enter RNAV waypoint 01.0/000.0.

Step 21. Adjust R160 (on board A2) until 1.0 nautical mile is read on DME display.



Step 22. Set both RNAV DSPL 1/2 switch and FLY 1/2 switch to 1.

Step 23. Enter RNAV waypoint: 41.0/000.0.

Step 24. Adjust R165 (on board A2) until 41.0 nautical miles are read on DME display.

Step 25. Repeat steps 19 through 24 until no further adjustment of R161 and R165 (both on board A2) is necessary.

Step 26. Release VHF navigation receiver TEST switch.

Step 27. Set both RNAV DSPL 1/2 switch and FLY 1/2 switch to 1.

Step 28. Enter RNAV waypoint: 00.0/000.0.

Step 29. Range DME (with DME test set) to 5.0 nautical miles.

Step 30. Adjust R85 (on board A2) until 4.9 nautical miles are read on DME display.

Step 31. Range DME (with DME test set) to 40.0 nautical miles.

Step 32. Adjust R91 (on board A2) until 40.0 nautical miles are read on DME display.

Step 33. Repeat steps 29 through 32 until further adjustment of R85 and R91 is no longer necessary.

Step 34. Adjust R117 (on board A2) until CDI vertical needle is centered.

Step 35. Set NAV test set TO/FROM switch to TO.

Step 36. Set NAV test set 9960 ~ modulation control to 0. Observe that the following occurs:

- a. The CDI flag appears.
- b. The vertical CDI needle deviates and then returns to its centered position ( $\pm 1/4$  division).

Step 37. If vertical needle does not return to its centered position ( $\pm 1/4$  division), adjust R117.

Step 38. Set NAV test set TO/FROM switch to FROM.

Step 39. Return NAV test set 9960 ~ modulation control to 30%.

Step 40. Repeat steps 35 through 39 until criteria of step 36b are met.

Step 41. Hold VHF navigation receiver (momentary ON) TEST switch in TEST position.

Step 42. Enter RNAV waypoint: 20.0/060.0.

Step 43. Adjust R24 (on board A2) until CDI vertical needle is centered.

Step 44. Release VHF NAV receiver test switch.

Step 45. Range DME (with DME test set) to 20.0 nautical miles.

Step 46. Set NAV test set bearing selectors to 090.0° and TO/FROM switch to FROM position.

Step 47. Adjust R24 slowly until minimum range is displayed on DME and CDI vertical needle is centered.

Step 48. Enter RNAV waypoint: 00.0/000.0.

Step 49. With RNAV ENR/APPR switch in APPR position rotate OBS knob (on CDI) until CDI vertical needle is offset four divisions.

Step 50. Set RNAV ENR/APPR switch to ENR.

Step 51. CDI vertical needle shall move to one division of center (on same side of zero as in step 49).

## 5-7. Localizer Alignment.

The following adjustments are made on board A3:

Step 1. Set switches in accordance with tables 5-1, 5-2, and 5-3 with the following exceptions and additions: Set DME ON/OFF/TEST switch to OFF position. NAV FREQ = 108.10 MHz.

Step 2. Turn power off and remove board A2 from RNAV chassis.

Step 3. Reconnect board A2 to RNAV with extender cables. Turn power on.

Step 4. Connect DVM on board A2 between J3-13

and J3-14 (which is vertical pointer + left and vertical pointer + right outputs respectively).

- Step 5. Set NAV test set to 0 DDM (difference in depth of modulation).
- Step 6. Adjust R43 (on board A3) until  $0 \pm 2$  mVdc is read on DVM.
- Step 7. Set NAV test set to .155 DDM left.
- Step 8. Adjust R36 (on board A3) until a reading of  $+150 \pm 2$  mVdc is read on DVM and CDI deflects to the left.
- Step 9. Set NAV test set to 0.155 DDM right.
- Step 10. Check that DVM reads  $150 \pm 5$  mVdc and CDI deflects to the right.
- Step 11. Set NAV test set to 0 DDM.
- Step 12. Turn off 90 Hz tone on NAV test set.
- Step 13. Check that CDI has flagged. If not, adjust R42 until it just flags.
- Step 14. Turn power off. Reinstall board A2 in RNAV.

#### 5-8. Functional Checks.

- Step 1. Prior to performing tests, set switches in accordance with tables 5-1, 5-2, and 5-3, with the following exceptions and additions: set NAV test set bearing selectors to  $0.0^\circ$ /FROM and OBS to  $0^\circ$ .
- Step 2. Check that vertical needle on CDI is centered ( $\pm 1/3$  division).
- Step 3. With OBS and NAV test set bearing selectors set (simultaneously) to each of the following bearings, check that vertical needle is centered ( $\pm 1/3$  division):  $030^\circ$ ,  $060^\circ$ ,  $090^\circ$ ,  $120^\circ$ ,  $150^\circ$ ,  $180^\circ$ ,  $210^\circ$ ,  $240^\circ$ ,  $270^\circ$ ,  $300^\circ$ ,  $330^\circ$ .
- Step 4. Set OBS to  $0^\circ$  and NAV test set bearing selectors to  $0.0^\circ$ .
- Step 5. Hold VHF navigation receiver TEST switch in TEST position and check that CDI vertical needle is centered ( $\pm 1/2$  division).

- Step 6. Release VHF navigation receiver TEST switch.
- Step 7. Hold, DME Control Unit, ON/OFF/TEST switch in TEST position. RNAV incandescent displays shall read: (DISTANCE) 188.8, and (BEARING) 888.8.
- Step 8. Toggle NAV test set TO/FROM switch slowly. perly in each case, reflecting the TO/FROM switch position.
- Step 9. Disconnect CDI from test setup and connect a milliammeter between RNAV connector P8-AA and P8-P. Current should read between 500 and 980 microamps.

#### NOTE

When the NAV test set TO/FROM switch is on FROM, P8-AA shall be positive; on TO, P8-P shall be positive.

- Step 10. Reconnect CDI. Set NAV test set 9960 tone to 0 amplitude. Check that CDI (OFF) flag appears. Return 9960 tone to nominal value of 30% modulation.
- Step 11. Set NAV test set 30 Hz tone to 0 amplitude. Check that CDI (OFF) flag appears. Return 30 Hz tone to nominal value of 30% modulation.
- Step 12. Set DME Control Unit switch the RNAV position.
- Step 13. Set RNAV ENR/APPR switch to ENR position.
- Step 14. Enter RNAV waypoint: 00.0/000.0.
- Step 15. Range DME to the settings in nautical miles listed below, using DME test set. Check that the DME Control Unit displays these readings within the tolerance shown.

| DME Range Setting    | DME Range Display              |
|----------------------|--------------------------------|
| 10.0 nautical miles  | $10.0 \pm 0.2$ nautical miles  |
| 30.0 nautical miles  | $30.0 \pm 0.3$ nautical miles  |
| 50.0 nautical miles  | $50.0 \pm 0.3$ nautical miles  |
| 100.0 nautical miles | $100.0 \pm 0.5$ nautical miles |

Step 16. Set RNAV ENR/APPR switch to APPR position.

Step 17. Repeat step 15 using the following table.

| DME Range Setting   | DME Range Display             |
|---------------------|-------------------------------|
| 10.0 nautical miles | $10.0 \pm 0.2$ nautical miles |
| 20.0 nautical miles | $20.0 \pm 0.2$ nautical miles |
| 30.0 nautical miles | $30.0 \pm 0.3$ nautical miles |
| 40.0 nautical miles | $40.0 \pm 0.3$ nautical miles |

Step 18. Set RNAV ENR/APPR switch to ENR position. Hold VHF navigation receiver TEST switch in TEST position.

Step 19. Enter the following RNAV waypoints; check that DME Control Unit displays these readings within listed tolerance.

| RNAV Waypoint | DME Range Display             |
|---------------|-------------------------------|
| 10.0/000.0    | $10.0 \pm 0.2$ nautical miles |
| 30.0/000.0    | $30.0 \pm 0.3$ nautical miles |
| 50.0/000.0    | $50.0 \pm 0.3$ nautical miles |
| 90.0/000.0    | $90.0 \pm 0.5$ nautical miles |

Step 20. Set RNAV ENR/APPR switch to APPR.

Step 21. Repeat step 19, using the following listing:

| RNAV Waypoint | DME Range Display |
|---------------|-------------------|
| 10.0          | $10.0 \pm 0.2$    |
| 20.0          | $20.0 \pm 0.2$    |
| 30.0          | $30.0 \pm 0.3$    |
| 40.0          | $40.0 \pm 0.3$    |
| 50.0          | $50.0 \pm 0.3$    |

Step 22. Release VHF navigation receiver TEST switch.

Step 23. Using DME test set range DME to 20.0 nautical miles. Set TO/FROM switch to TO.

Step 24. Enter RNAV waypoint: 00.0/000.0.

Step 25. Set DME Control Unit function switch to RNAV.

Step 26. Set NAV test set bearing selectors to  $0.0^\circ$ .

Step 27. Set the OBS to  $0 \pm 1^\circ$ . The OBS vertical needle shall center.

Step 28. Matching the OBS setting to the NAV test set bearings listed below, the CDI vertical needle shall center. The OFF flag, at each bearing shall appear when the 9960 Hz signal is at zero modulation, and shall disappear at 30% modulation.  $060.0^\circ$ ,  $120.0^\circ$ ,  $180.0^\circ$ ,  $240.0^\circ$ ,  $300.0^\circ$ .

Step 29. Set DME Control Unit function switch to RNAV position.

Step 30. Enter RNAV waypoint: 20.0/000.0.

Step 31. Set OBS to  $0 \pm 1^\circ$ .

Step 32. Hold VHF navigation receiver TEST switch in TEST position.

Step 33. Check that CDI vertical needle centers and DME Control Unit reads  $20.0 \pm 0.3$  nautical miles.

Step 34. Release VHF navigation receiver TEST switch.

Step 35. Enter RNAV waypoint: 20.0/060.0.

Step 36. Set OBS to  $60 \pm 1^\circ$ .

Step 37. Hold VHF navigation receiver TEST switch in TEST position.

Step 38. Check that CDI vertical needle centers and DME Control Unit reads  $20.0 \pm 0.3$  nautical miles.

Step 39. Repeat steps 35 through 38, but enter RNAV waypoint and OBS using the following bearings:  $120.0^\circ$ ,  $180.0^\circ$ ,  $240.0^\circ$ ,  $300.0^\circ$ .

Step 40. Release VHF navigation receiver TEST switch.

Step 41. Set NAV test set bearing selector to  $0.0^\circ$ /TO.

Step 42. Enter RNAV waypoint: 20.0/060.0 and observe distance displayed on DME Control Unit; it shall be  $20 \pm 0.3$  nautical miles.

Step 43. Set OBS to  $120 \pm 1^\circ$ ; the OBS vertical needle shall center and TO/FROM flag shall indicate TO.



- Step 44. Enter RNAV waypoint: 20.0/090.0.
- Step 45. DME Control Unit display shall read  $28.3 \pm 3$  nautical miles.
- Step 46. Set OBS to  $135 \pm 1^\circ$ ; the OBS vertical needle shall center and TO/FROM flag shall indicate TO.
- Step 47. Enter RNAV waypoint: 00.5/000.0.
- Step 48. Set RNAV ENR/APPR switch to ENR position.
- Step 49. Set OBS to  $180 \pm 1^\circ$ .
- Step 50. Hold VHF navigation receiver TEST switch in TEST position.
- Step 51. The OBS vertical needle shall center and the TO/FROM flag shall indicate FROM and shall be steady.
- Step 52. Release VHF navigation receiver TEST switch.
- Step 53. Set OBS to  $0 \pm 1^\circ$ .
- Step 54. Hold VHF navigation receiver TEST switch in TEST position.
- Step 55. The OBS vertical needle shall center and the TO/FROM flag shall indicate TO and shall be steady.
- Step 56. Release VHF navigation receiver TEST switch.
- Step 57. Range DME, using DME test set, to 4.0 nautical miles.
- Step 58. Set NAV test set bearing selector to  $0^\circ$  and TO/FROM switch to FROM.
- Step 59. Enter RNAV waypoint: 00.0/000.0.
- Step 60. Set OBS to  $0 \pm 1^\circ$ . Vertical OBS needle shall be centered and CDI TO/FROM flag shall indicate FROM.
- Step 61. Set NAV test set TO/FROM switch to TO. Observe the following: the vertical CDI needle shall swing less than  $1 \frac{1}{2}$  divisions and shall settle to the center position  $\pm 1/2$  division in 10 seconds or less. The CDI TO/FROM flag shall display TO in 10 seconds or less.
- Step 62. Set NAV test set 9960 tone to 0 modulation and note the following: OFF flag shall appear and the DME display shall be blanked.
- Step 63. Set NAV test set 9960 tone to 30% modulation.
- Step 64. Channel VHF navigation receiver to any frequency, other than that of NAV test set.
- Step 65. Observe that DME display is blanked and that CDI OFF flag is displayed.
- Step 66. Tune NAV test set to localizer (ILS) channel.
- Step 67. Set VHF navigation receiver to same localizer frequency.
- Step 68. Set DME Control Unit mode select switch to NAV 1 mode.
- Step 69. Observe that DME display is no longer blanked and that CDI OFF flag is not displayed.
- Step 70. CDI vertical needle shall be centered  $\pm 1/3$  division. TO/FROM flag shall indicate TO.
- Step 71. Set NAV test set DDM to 0.093 left.
- Step 72. CDI vertical needle shall be  $3 \pm 1/3$  divisions left of center. TO/FROM flag shall indicate TO.
- Step 73. Set NAV test set DDM to 0.093 right.
- Step 74. CDI vertical needle shall be  $3 \pm 1/3$  divisions right of center. TO/FROM flag shall indicate TO.
- Step 75. Adjust NAV test set 150 Hz tone to zero modulation.
- Step 76. CDI OFF flag shall be displayed.
- Step 77. Adjust NAV test set 150 Hz tone to nominal value.
- Step 78. Adjust NAV test set 90 Hz tone to zero modulation.
- Step 79. CDI OFF flag shall be displayed.
- Step 80. Set NAV test set to VOR frequency.
- Step 81. Set VHF navigation receiver to same frequency.



Step 82. Enter RNAV waypoint: 00.0/000.0.

**Step 83. Set DME function switch to RNAV.**

**Step 84. Range DME, using DME test set, to 25.0 nautical miles.**

Step 85. Set NAV test set bearing to  $0.0^{\circ}$ /FROM.

Step 86. Use the OBS to center CDI to  $0 \pm 1^\circ$ .

**Step 87.** Set NAV test set bearing to  $10.0^{\circ}$ /FROM. CDI vertical needle shall deflect smoothly and continuously  $4\ 1/2 \pm 1/2$  divisions to the right in  $17 \pm 7$  seconds.

**Step 88. Set RNAV DSPL 1/2 and FLY 1/2 switches to 1, and enter the following waypoints.**  
The incandescent display shall read as shown.

[illegible]

Step 89. Check operation of RNAV Fly/Display annunciator lamp by setting RNAV DSPL 1/2 and FLY 1/2 switches as follows:

| DSPL 1/2 | FLY 1/2 | LAMP     |
|----------|---------|----------|
| 1        | 1       | OFF      |
| 1        | 2       | FLASHING |
| 2        | 1       | FLASHING |
| 2        | 2       | OFF      |

Step 90. Check RNAV logic to autopilot by setting DME function switch, VHF navigation receiver channel and the RNAV ENR/APPR switch as shown below. For each setting of the switches, check the voltages with the DVM at J1-BB and J1-W (using J1-C as ground) for the voltage levels shown below.

| DME FCTN SW | VHF NAV RCVR CHAN | RNAV ENR/APPR SW | RNAV J1-BB | RNAV J1-W  |
|-------------|-------------------|------------------|------------|------------|
| NAV         | VOR               | -                | + 28 V nom | + 28 V nom |
| NAV         | ILS               | -                | < + 1 V    | + 28 V nom |
| RNAV        | VOR               | ENR              | < + 1 V    | < + 1 V    |
| RNAV        | VOR               | APPR             | + 28 V nom | < + 1 V    |
| RNAV        | ILS               | -                | < + 1 V    | < + 1 V    |

Step 91. Set RNAV DISTANCE multilever switches to 199.9.

Step 92. Set RNAV BEARING multilever switches to 000.0°.

#### NOTE

To prevent accidental transfer of information, the XFER circuitry has a built in delay of 0.1 to 0.25 seconds. The XFER button should be depressed and not released until the data is displayed.

Step 93. Test the XFER button delay by brushing finger against button quickly. The incandescent display shall not reflect the new information.

#### 5-9. SUBASSEMBLY TEST AND ALIGNMENT PROCEDURES.

Test and alignment of individual circuit boards must be followed by the alignment of the RNAV as a unit. The test setup for individual boards is the same as for the overall unit (reference paragraph 5-2).

#### 5-10. ALIGNMENT PROCEDURE FOR COMPUTER-CONVERTER BOARD A2.

The A2 board is aligned as follows:

a. OMNICONVERTER - Align omniconverter as follows:

Step 1. Set DME control unit selector switch to NAV 1 mode.

Step 2. Rotate pots R72 and R67 fully counter-clockwise.

Step 3. Monitor U1 pin 7 with scope.

Step 4. Adjust L1 until scope display trace is fairly symmetrically modulated with 60 Hz.

Step 5. Monitor U3 pin 1 with scope. A clean recovered reference 30 Hz sinewave, about 15 volts peak to peak, should be displayed.

Step 6. Monitor U3 pin 7 with scope. A clean recovered reference 30 Hz sinewave, about 15 volts peak to peak, should be displayed.

Step 7. Short pin 3 of U28 to ground.

Step 8. Adjust R153 to obtain  $0.00 \pm .001$  Vdc at pin 6 of U28.

Step 9. Remove short from pin 3 of U28. Adjust R182 to obtain  $1.228 \pm .01$  Vdc between TP5 and TP6.

Step 10. Set OBS knob on indicator and phase angle selector on NAV test set to 60°.

Step 11. Toggle "TO-FROM" switch on NAV test set.

Step 12. Adjust R56 until the vertical needle settles in the same position in both the "TO" and "FROM" positions.

Step 13. Adjust R138 to center vertical needle.

Step 14. Set OBS and NAV test set phase angle selector to 150°.

Step 15. Adjust R27 to move the vertical needle "1/2" of the way back to center.

Step 16. Adjust R56 to center vertical needle.

Step 17. Set OBS and NAV test set phase angle selector to 60°.

Step 18. Adjust R56 to center vertical needle.

Step 19. Repeat steps 14 through 18 inclusive until vertical needle is centered in both the "TO" and "FROM" positions at 60° and 150°.

Step 20. The omniconverter is now aligned. Check it out as follows:

Step 21. Set omnibearing selector to zero degrees.

Step 22. Set the phase angle selector to zero degrees, the vertical (CDI) needle should center.

Step 23. Repeat steps 21 and 22 for the following degrees: 030°, 060°, 090°, 120°, 150°, 180°, 210°, 270°, 300°, and 330°.

Step 24. Hold NAV test set (momentary ON) switch to TEST position.

Step 25. Set OBS to zero degrees.

Step 26. Adjust R46 to center (CDI) vertical needle. "TO-FROM" flag should read "FROM".

b. COMPUTER SECTION ALIGNMENT - Align the computer section as follows:

Step 1. Set DME Control Unit selector to RNAV.

Step 2. Set DME test set to 1.0 NM, then adjust test set to obtain 40.0 mV between A2J2-14 and A2J2-13. (Use DVM with — lead to J2-13 and + lead to J2-14.

### NOTE

The DME reading is based upon 40 mV per nautical mile on the DME test set.

Step 3. Adjust R85 to obtain 40.0 mV at pin 1 of U16 using digital voltmeter.

Step 4. Set DME test set to 40.0 NM, then adjust test set to obtain 1.600 Vdc as in step 2.

Step 5. Adjust R91 for 2.00 Vdc at pin 1 of U16.

Step 6. Monitor TP1 with oscilloscope. A squarewave with ±2 volts swing about ground should be observed.

Step 7. Set DME test set to 0.0 NM, then adjust DME test set to obtain 0 mV at U1-16.

Step 8. Adjust R85 for 0.00 volts swing at TP1. (Use lowest voltage scale on scope.)

Step 9. Set DME test set to 40.0 NM.

Step 10. Monitor TP3 with scope. A distorted sinewave should be observed.

Step 11. Monitor TP4 with scope. A good non-distorted sinewave of approximately 3.6 volts peak to peak should be observed.

Step 12. Monitor pin 6 of U18. A sinewave of about 1.8 volts peak to peak should be observed.

Step 13. Switch ENR APPR switch to APPR; sinewave should increase by a factor of 4 (approximately 7.2 volts peak to peak).

Step 14. Monitor junction of R157 and CR17; a negative going half wave rectified waveform shall be observed.

Step 15. Set RNAV ENR/APPR switch to ENR.

Step 16. Set DME test set to 0.0 NM.

Step 17. Monitor TP4 with scope. Sinewave amplitude shall be less than 10 mV peak to peak.

Step 18. Monitor junction of R161 and R160 with digital voltmeter.

Step 19. Adjust R160 to obtain 0.00 Vdc.

Step 20. Monitor RNAV range (J2-2) and RNAV range common (J2-3) with digital voltmeter.

Step 21. Adjust R171 pot to obtain 0.00 Vdc. Set output of DME test set to 40.0 NM.

Step 22. Monitor RNAV range (J2-2) and RNAV range common (J2-3) with digital voltmeter.

Step 23. Adjust R168 for 1.600 Vdc.



Step 24. Set DME test set to 0.0 NM.

Step 25. Adjust R171 to obtain reading of 0 volts  $\pm$  2 millivolts on DVM.

Step 26. Set RNAV ENR/APPR switch to APPR.

Step 27. Monitor RNAV range (J2-2) and RNAV range common (J2-3) with digital voltmeter.

Step 28. Adjust R160 for 0.00 Vdc.

Step 29. Set DME test set to 40.0 NM.

Step 30. Adjust R165 for 1.600 Vdc.

Step 31. Set DME test set to 0.0 NM. Digital voltmeter should read 0.00 Vdc.

Step 32. Set DME test set to 10.0 NM.

Step 33. Monitor RNAV range (J2-2) and RNAV range common (J2-3) with digital voltmeter.

Step 34. Digital voltmeter should read 400 millivolts when RNAV ENR/APPR switch is in either ENR or APPR positions.

Step 35. Verify the following ranges and outputs:

| SET DME TEST SET TO | DVM SHOULD READ IN ENR AND APPR |
|---------------------|---------------------------------|
| 20.0 NM             | 800 mV                          |
| 40.0 NM             | 1.600 V                         |
| 80.0 NM*            | 3.200 V*                        |

\* ENR mode only

#### NOTE

In APPR position highest input voltage is 1.60 volts.

Step 36. Monitor RNAV range (J2-2) with scope.

Step 37. Set DME test set to 50.0 NM. Ripple as observed on scope should be approximately 120 millivolts peak to peak.

Step 38. Set DME test set to 40.0 NM.

Step 39. Set phase angle setting NAV test set to 0°.

Step 40. Set OBS to 0°.

Step 41. Monitor with scope pin 6 of U26.

Step 42. Set RNAV ENR/APPR switch to ENR position.

Step 43. Adjust R117 for centering of vertical needle on CDI.

Step 44. Switch RNAV ENR/APPR switch to APPR position and fine tune with R117 for centering of vertical CDI needle.

Step 45. Rotate OBS 180°; vertical CDI needle should center.

Step 46. Set DME test set to 40.0 NM.

Step 47. Monitor RNAV range (J2-2) with digital voltmeter.

Step 48. Set RNAV ENR/APPR switch to ENR.

Step 49. Adjust R168 to obtain reading of 1.600 Vdc on digital voltmeter.

Step 50. Switch RNAV ENR/APPR switch to APPR position.

Step 51. Adjust R165 to obtain reading of 1.600 Vdc on digital voltmeter.

c. TEST POINT CHECKOUT - Check and adjust voltages and signals on test points in board A2 as follows:

1. Level Test Point - Monitor A2J1-5 and perform adjustments as follows:

Step 1. Monitor A2J1-5 with digital voltmeter (should be 3.12 Vac).

Step 2. Adjust modulation on NAV test set to obtain 1/2 the voltage reading obtained in step 1.

Step 3. Monitor pin 7 of U5 with scope.

Step 4. Adjust R67 until level switches either from a high to a low, or from a low to a high.

Step 5. Readjust R67 until level just switches.

Step 6. Monitor pin 6 of U7 with scope.



- Step 7. Adjust R72 as in step 4.
2. **OMNI FLAG Output** - Monitor the OMNI FLAG output and perform test as follows:
- Step 1. Monitor Omni flag output at A2Q9-E with either digital voltmeter or scope.
- Step 2. Vary output level (modulation level) of NAV test set between 0% and 60%.
- Step 3. Voltage level, as observed with scope or DVM, should switch between 0 and +5 volts.
3. **RNAV FLAG Output** - Monitor the RNAV FLAG output A2Q10-C and perform same test as for OMNI FLAG output, in paragraph 2.
4. **VOR/RNAV To AUTOPILOT Test Point** - Check out VOR/RNAV test point as follows:
- Step 1. Monitor test point (A2J2-6) with either digital voltmeter or scope.
- Step 2. Set DME control unit function switch to RNAV position.
- Step 3. Test point should be at zero volts.
- Step 4. Set switch to NAV 1 position.
- Step 5. Test point should be at +5 volts.
5. **GAIN CHANGE Test Point** - Check out GAIN CHANGE test point as follows:
- Step 1. Monitor test point (RNAV J1-BB) with either digital voltmeter or scope.
- Step 2. Set RNAV ENR/APPR switch to the ENR position; test point should be at +5 volts.
- Step 3. Set switch to APPR position; test point should be at zero volts.
- Step 4. Set NAV test set to LOCALIZER (ILS) position.
- Step 5. Set RNAV ENR/APPR switch to ENR position. Test point should be at zero volts.

- Step 6. Set NAV test set to VOR position. Test point should be at +5 volts.

6. **VERTICAL FLAG Test Point** - Check out VERTICAL FLAG test point as follows:

- Step 1. Monitor test point (A2J3-6) with digital voltmeter or scope.
- Step 2. Vary the NAV test set attenuator until the vertical flag on the CDI is in the OFF position.
- Step 3. The test point should be at zero volts. Vary the NAV test set attenuator until the vertical flag on the CDI is in the UNFLAGGED position. The test point should be at +5 volts.

**5-11. ALIGNMENT PROCEDURE FOR LOC, DVM, DIMMER BOARD A3.**

The A3 board is aligned as follows:

- a. **DIMMER CIRCUIT** - The dimmer circuit is checked out and adjusted as follows:

- Step 1. Monitor dimmer output J4-4 to ground with digital voltmeter.
- Step 2. Set the dimmer power supply (0-28 V supply) to zero volts. Digital voltmeter should read +5 Vdc.
- Step 3. Increase the power supply until the digital voltmeter reading just drops.
- Step 4. With the power supply set at this voltage, adjust R56 for minimum voltage.
- Step 5. With zero volts in, output should be +5 volts.
- Step 6. With +14 volts in, output should be approximately +2.5 volts.
- Step 7. With +28 volts in, output should be +5 Vdc. Display lighting should track RT-428A. Readjust R56 if required.

- b. **LOCALIZER ALIGNMENT** - Align localizer as follows:

- Step 1. Set DME control unit function switch to NAV 1 mode.

- Step 2. Set NAV test set and VHF navigation receiver to ILS frequency (e.g. 108.10 MHz, 110.9 MHz).
- Step 3. Set NAV test set tone localizer switch to 0 dBm.
- Step 4. Monitor localizer at connector J3-1 to ground (located on C24) with digital voltmeter.
- Step 5. Set tone localizer switch on NAV test set to 7.5 dB (90 Hz) and adjust R36 to read -168 mV on digital voltmeter.
- Step 6. Set NAV test set to 0 dB. Digital voltmeter should still read zero volts; if not, adjust R43.
- Step 7. Check all points as follows:

| dB (DDM)             | 150 Hz   | 90 Hz     |
|----------------------|----------|-----------|
| 0 dB (0 DDM)*        | 0        | 0         |
| .5 dB                | 11 mV    | -11 mV    |
| 2 dB                 | 45 mV    | -45 mV    |
| 2.007 dB (.046 DDM)* | 45.16 mV | -45.16 mV |
| 4 dB                 | 90 mV    | -90 mV    |
| 4.114 dB (.093 DDM)* | 92.6 mV  | -92.6 mV  |
| 7.102 dB (.155 DDM)* | 159.8 mV | -159.8 mV |
| 7.5 dB               | 168 mV   | -168 mV   |

\* IFR NAV 750

- Step 8. Monitor LOC flag by connecting digital voltmeter or scope between J3-2 and ground.
- Step 9. Set tone localizer switch at 7.5 dB (90 Hz); the level should be low or zero volts.
- Step 10. Set tone localizer to the CAL 90 position. Level should go high (+5 volts); if not, adjust R42 until this is obtained.
- Step 11. Set tone localizer to 7.5 dB (150 Hz); the level should be low.
- Step 12. Switch to CAL 150; the level should go high. If not, adjust R42.
- Step 13. Check that the level is low in all positions except CAL 150 - and CAL 90 - positions.
- Step 14. Monitor directly across RNAV range analog

and RNAV range common test points by connecting digital voltmeter to J3-5 and J3-6.

- Step 15. Set DME Control Unit function switch to RNAV mode. Adjust the RNAV waypoint and/or DME test set range control until digital voltmeter reads zero volts.
- Step 16. Adjust R17 for .1 reading on the DME control unit.
- Step 17. Adjust the RNAV waypoint and/or DME test set range control until digital voltmeter reads +4.00 volts.
- Step 18. Adjust R24 for 100.00 reading on the DME control head.
- Step 19. Check all points as follows:

| DVM Readout | DME Readout |
|-------------|-------------|
| 0.000 V     | 0.1         |
| 0.040 V     | 1.0         |
| 0.400 V     | 10.0        |
| 1.200 V     | 30.0        |
| 2.000 V     | 50.0        |
| 2.800 V     | 70.0        |
| 4.000 V     | 100.0       |

#### 5-12. TEST PROCEDURE FOR DISPLAY BOARD A4.

- Step 1. Set RNAV DSPL 1/2 and FLY 1/2 switches to 1.
- Step 2. Set RNAV waypoint: 177.7/177.7. Press XFER.
- Step 3. RNAV readouts shall display: 177.7/177.7.
- Step 4. Set RNAV DSPL 1/2 switch to 2. Annunciator light shall flash.
- Step 5. Set RNAV waypoint: 88.8/088.8. Press XFER.
- Step 6. RNAV readouts shall display 88.8/088.8.
- Step 7. Set FLY 1/2 switch to 2. Annunciator light shall be out.
- Step 8. RNAV readout shall display: 88.8/088.8.
- Step 9. Set RNAV waypoints and note RNAV incandescent displays as follows:

| RNAV Waypoint | RNAV Display |
|---------------|--------------|
| 00.0/000.0    | 00.0/000.0   |
| 111.1/111.1   | 111.1/111.1  |
| 22.2/222.2    | 22.2/222.2   |
| 22.2/360.0    | 188.8/888.8  |
| 22.2/380.0    | 188.8/888.8  |
| 22.2/359.9    | 22.2/359.9   |

Step 10. Set RNAV FLY 1/2 and DSPL 1/2 switches to 1.

Step 11. RNAV shall display: 177.7/177.7.

Step 12. Press DME control unit ON/OFF/TEST switch to TEST position.

Step 13. RNAV shall display: 188.8/888.8.

### 5-13. TEST PROCEDURE FOR DIGITAL PROCESSOR BOARD A5.

- Step 1. Monitor U26 pin 5 for  $16.66 \pm .5$  ms square-wave. Adjust R25 for 50% ( $\pm 5\%$ ) duty cycle.
- Step 2. Connect channel "A" of scope to J1, pin 3. Connect channel "B" to J1, pin 11. Both scope channels should display squarewaves.
- Step 3. Range DME, with DME test set, to 2 nautical miles.
- Step 4. Vary NAV test set output phase from  $0.0^\circ$  through  $360^\circ$ , as well as from  $360^\circ$  through  $0.0^\circ$ .
- Step 5. Observe that squarewave on scope channel B tracks squarewave on scope channel A.
- Step 6. Step change the phase, with NAV test set, by
- Step 7. Range DME, with DME test set, to 10 nautical miles.
- Step 8. Repeat step 4. Observe that channel A waveform is phase locked with channel B waveform.
- Step 9. Step change the phase (first in one direction, then the other) with NAV test set by approxi-

mately  $30^\circ$ . Channel B signal should not jump and lock with channel A signal, but should slowly track to channel A signal.

Step 10. Enter RNAV waypoint: 00.0/000.0.

Step 11. Connect DVM between TP14 (+) and ground.

Step 12. Adjust R43 for 0.000 Vdc reading on DVM.

Step 13. Enter RNAV waypoint: 70.0/000.0.

Step 14. Adjust R33 for 3.500 Vdc reading on DVM.

Step 15. Connect channel "A" of scope to J1, pin 3 and channel "B" of scope to J3, pin 9.

Step 16. Observe squarewaves (not necessarily in phase).

Step 17. Enter  $.1^\circ$  on RNAV bearing minilever switches and press XFER. This should cause a shift of approximately  $10 \mu\text{sec}$  in the channel B waveform.

Step 18. Repeat step 17 for bearings of  $.2^\circ$ ,  $.4^\circ$ ,  $.8^\circ$ ,  $1^\circ$ ,  $2^\circ$ ,  $4^\circ$ ,  $8^\circ$ ,  $10^\circ$ ,  $20^\circ$ , etc, so that each decade is tested. In all cases, the channel B waveform should shift approximately  $10 \mu\text{sec}$  for each  $.1^\circ$ .

Step 19. Set DISTANCE switches to zero and transfer as before.

### NOTE

Channel "B" signal also zero. Transfer .1 mile and note small signal appears on channel "B". Increase to .2 miles. Amplitude should double. Check .4 and .8 miles and all appropriate 1, 2, 4, and 8 positions on DISTANCE switches. Amplitude should be 100 mV P-P per 1.0 mile shift.

### 5-14. ALIGNMENT PROCEDURE FOR POWER CONVERTER BOARD A6.

The power converter board has no physical adjustments. Maintenance consists of taking voltage readings and checking waveforms. Remove and replace any defective component.





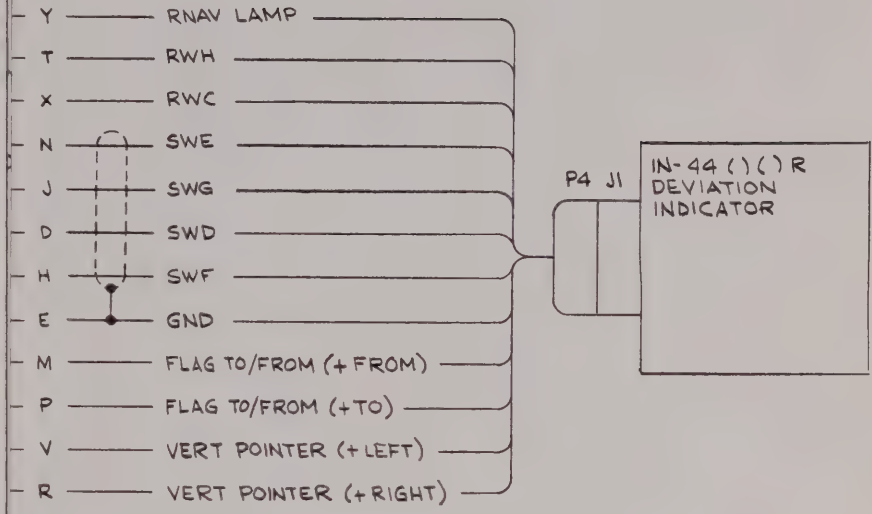


Figure 5-1. RNAV Test Setup

0383-1-11



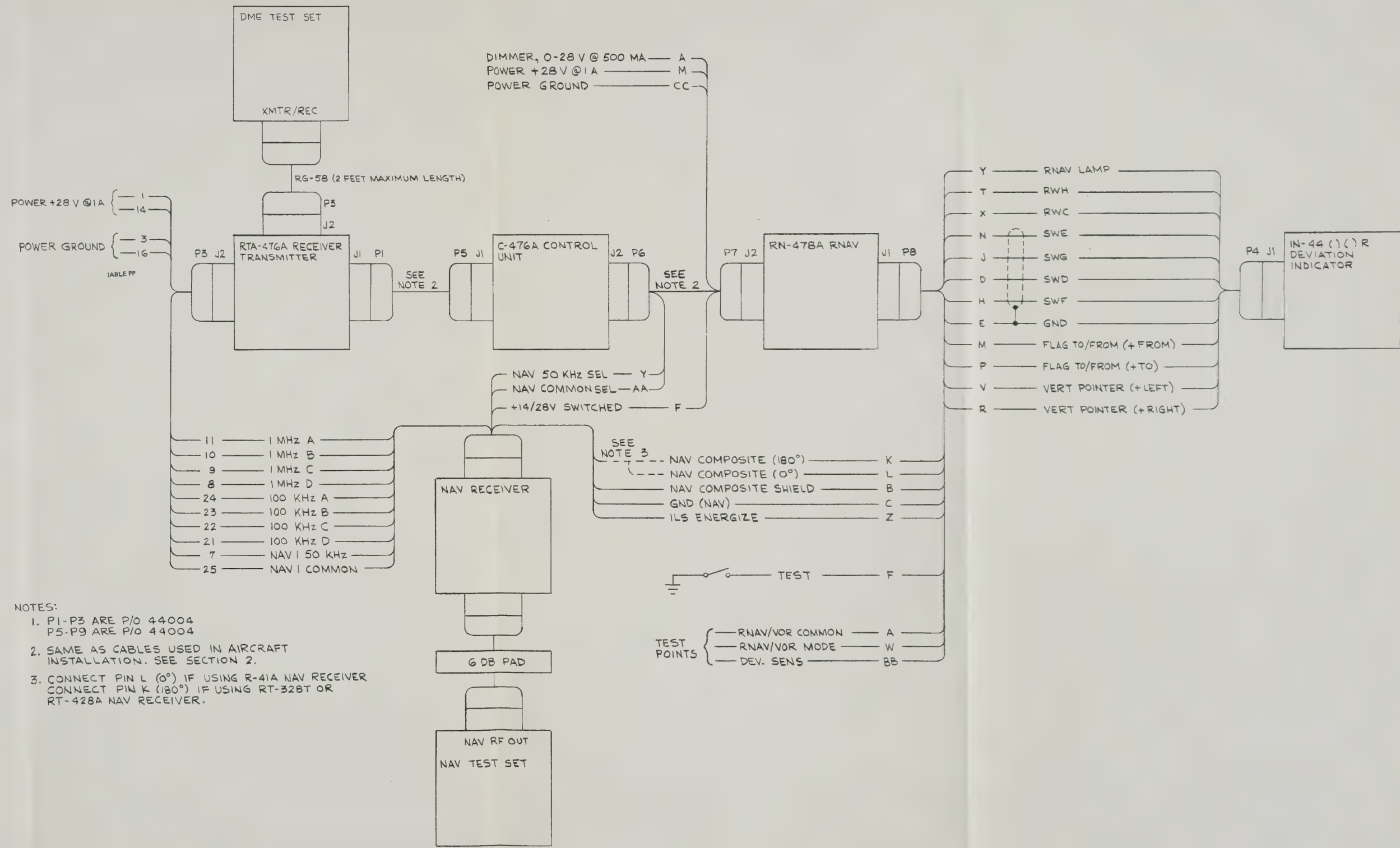


Figure 5-1. RNAV Test Setup





## SECTION 6

## DIAGRAMS

Figure

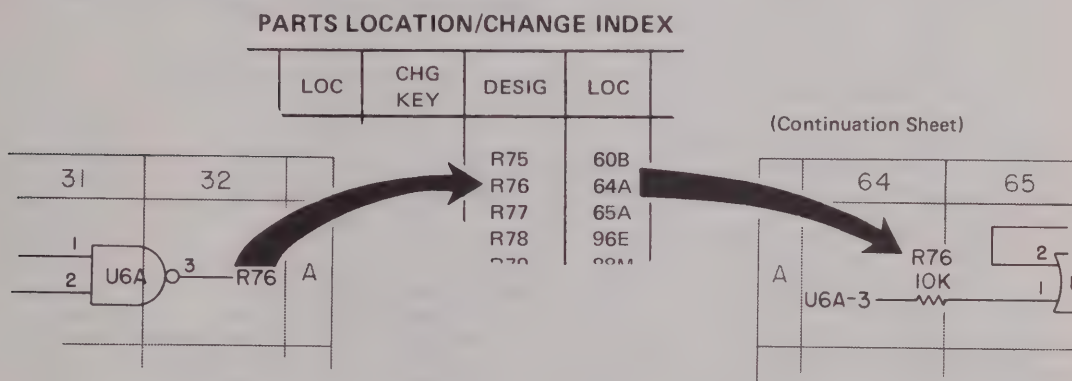
Title

Page

|     |                                                     |      |
|-----|-----------------------------------------------------|------|
| 6-1 | Schematic, Board Interconnect (A1) .....            | 6-3  |
| 6-2 | Schematic, Computer/Converter (A2) (4 Sheets) ..... | 6-4  |
| 6-3 | Schematic, LOC, DVM, Dimmer (A3) (3 Sheets) .....   | 6-10 |
| 6-4 | Schematic, Display (A4) (3 Sheets) .....            | 6-14 |
| 6-5 | Schematic, Digital Processor (A5) (4 Sheets) .....  | 6-18 |
| 6-6 | Schematic, Power Converter (A6) (2 Sheets) .....    | 6-24 |

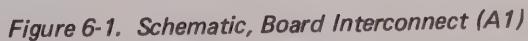
## NOTES:

1. This section contains the schematic and wiring diagrams. Sheet 1 of each schematic contains a parts location/change index which lists the zone location of each electrical component. Where a signal must be continued on another sheet, the reference designation of the component is shown. The signal can then be easily traced by referring to the index as shown below.



2. Revisions to schematics are documented in the following two ways:
  - a. The ARC engineering drawing number and revision level are shown on the lower left hand corner of the schematic.
  - b. Where a revised schematic is issued to the manual, the individual changes are listed in the Chg Key column of the parts location/change index.
3. All waveform patterns will be located on Sheet 1 of a Multi-Sheet Schematic. Circled numbers on the schematic will correspond to the applicable waveform pattern on Sheet 1.



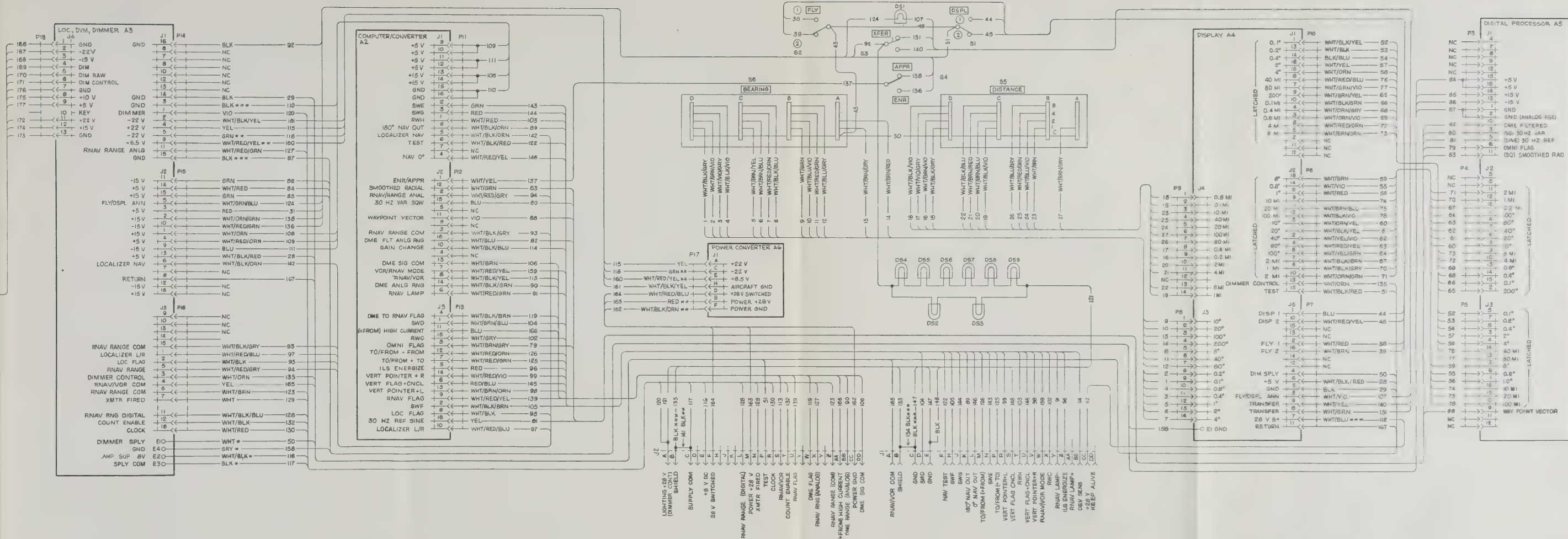
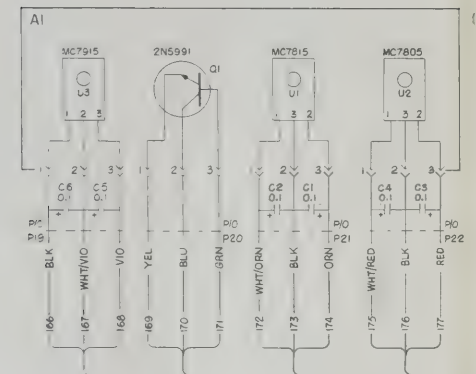






## NOTES:

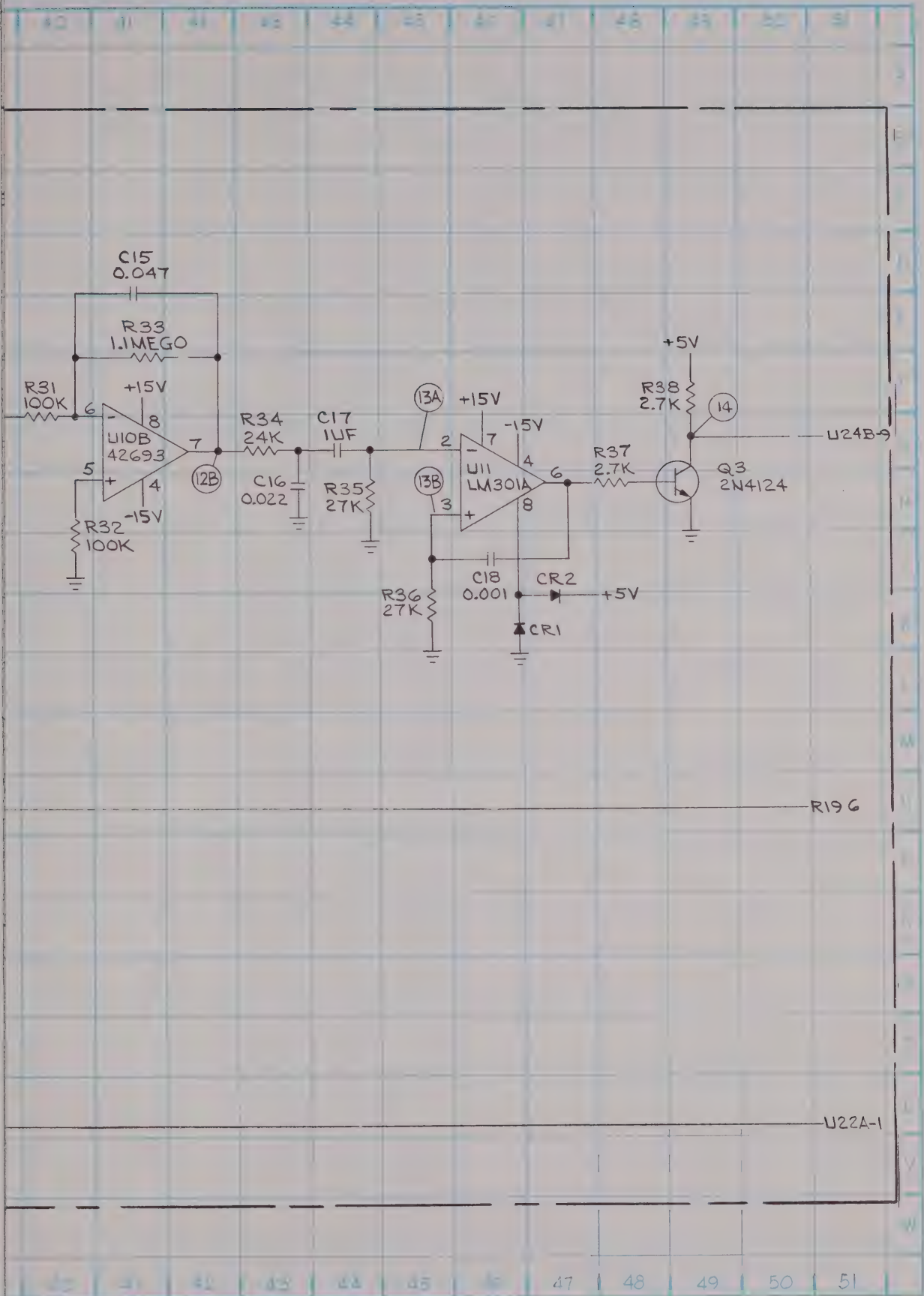
1. All components are part of A1, Chassis Assembly.
2. All wires are 20 AWG unless otherwise indicated.
- indicates 16 AWG wire.
- \*\* indicates 22 AWG wire.
- \*\*\* indicates 24 AWG wire.



# PARTS LOCATION/CHANGE INDEX

| SIG | LOC | CHG<br>KEY | DESIG | LOC   | CHG<br>KEY | DESIG | LOC  | CHG<br>KEY | DESIG | LOC  | CHG<br>KEY | DESIG | LOC  | CHG<br>KEY |
|-----|-----|------------|-------|-------|------------|-------|------|------------|-------|------|------------|-------|------|------------|
| 3   | 17C |            | R70   | 28P   |            | R127  | 70U  |            | R183  | 136J |            | U22   | 147D |            |
| 4   | 17G |            | R71   | 31N   |            | R128  | 72P  |            | R184  | 137E |            |       | 60-H |            |
| 5   | 19B |            | R72   | 30T   |            | R129  | 72S  |            | R185  | 139G |            |       | 58K  |            |
| 6   | 21C |            | R73   | 31T   |            | R130  | 73N  |            | R186  | 139J |            |       | 60L  |            |
| 7   | 21F |            | R74   | 32R   |            | R131  | 75R  |            | R187  | 140F |            |       | 61K  |            |
| 8   | 22D |            | R75   | 60B   |            | R132  | 77R  |            | R188  | 30F  |            | U23   | 137G |            |
| 9   | 23D |            | R76   | 64A   |            | R133  | 78R  |            | R189  | 20E  |            |       | 140H |            |
| 0   | 25D |            | R77   | 65A   |            | R134  | 80P  |            | R190  |      |            | U24   | 64J  |            |
| 1   | 26C |            | R78   | 96E   |            | R135  | 78T  |            | R191  | 65G  |            |       | 51G  |            |
| 2   | 25E |            | R79   | 88M   |            | R136  | 79U  |            | R192  | 67G  |            |       | 64L  |            |
| 3   | 28C |            | R80   | 87E   |            | R137  | 81U  |            | R193  | 132T |            |       | 63T  |            |
| 4   | 28E |            | R81   | 113C  |            | R138  | 82T  |            | R194  | 109D |            |       | 65T  |            |
| 5   | 29D |            | R82   | 115B  |            | R139  | 82R  |            | R195  | 70F  |            | U25   | 67N  |            |
| 6   | 31C |            | R83   | 112D  |            | R140  | 81M  |            | R196  | 51N  |            | U26   | 73R  |            |
| 7   | 35F |            | R84   | 113E  |            | R141  | 83M  |            | R197  | 65K  |            | U27   | 80S  |            |
| 8   | 36F |            | R85   | 111G  |            | R142  | 87J  |            | R198  | 67J  |            | U28   | 94S  |            |
| 9   | 37H |            | R86   | 112G  |            | R143  | 87H  |            | R199  | 95E  |            |       |      |            |
| 0   | 37I |            | R87   | 113H  |            | R144  | 89J  |            | U1    | 6E   |            |       |      |            |
| 1   | 40F |            | R88   | 117D  |            | R145  | 91H  |            |       | 10E  |            |       |      |            |
| 2   | 40J |            | R89   | 119F  |            | R146  | 89R  |            | U2    | 16D  |            |       |      |            |
| 3   | 41E |            | R90   | 118G  |            | R147  | 92T  |            | U3    | 26D  |            |       |      |            |
| 4   | 43G |            | R91   | 118H  |            | R148  | 92V  |            |       | 31E  |            |       |      |            |
| 5   | 44H |            | R92   | 121D  |            | R149  |      |            | U4    | 18L  |            |       |      |            |
| 6   | 45K |            | R93   | 122C  |            | R150  | 81K  |            | U5    | 25J  |            |       |      |            |
| 7   | 48H |            | R94   | 121E  |            | R151  |      |            |       | 30K  |            |       |      |            |
| 8   | 49F |            | R95   | 121H  |            | R152  | 83M  |            | U6    | 34N  |            |       |      |            |
| 9   |     |            | R96   | 116H  |            | R153  | 95R  |            |       | 60A  |            |       |      |            |
| 0   | 4M  |            | R97   | 115J  |            | R154  | 129R |            |       | 62B  |            |       |      |            |
| 1   | 6P  |            | R98   | 115K  |            | R155  | 130N |            |       | 66B  |            |       |      |            |
| 2   | 7M  |            | R99   | 117K  |            | R156  | 129T |            | U7    | 30R  |            |       |      |            |
| 3   | 8L  |            | R100  | 111N  |            | R157  | 133R |            | U8    | 17S  |            |       |      |            |
| 4   | 10L |            | R101  | 110-9 |            | R158  | 134R |            | U9    | 24S  |            |       |      |            |
| 5   | 14L |            | R102  | 113N  |            | R159  | 135U |            | U10   | 37F  |            |       |      |            |
| 6   | 16L |            | R103  | 114M  |            | R160  | 137U |            |       | 41G  |            |       |      |            |
| 7   | 18J |            | R104  | 116N  |            | R161  | 138V |            | U11   | 46G  |            |       |      |            |
| 8   | 20K |            | R106  | 117P  |            | R162  | 139V |            | U12   | 70B  |            |       |      |            |
| 9   | 13R |            | R107  | 118P  |            | R163  | 137R |            |       | 74K  |            |       |      |            |
| 0   | 14R |            | R108  | 120L  |            | R164  | 142M |            |       | 76K  |            |       |      |            |
| 1   | 16R |            | R109  | 120N  |            | R165  | 144L |            | U13   | 72D  |            |       |      |            |
| 2   | 17P |            | R110  | 118S  |            | R166  | 145D |            |       | 86D  |            |       |      |            |
| 3   | 16T |            | R111  | 122R  |            | R167  | 142N |            |       | 86J  |            |       |      |            |
| 4   | 19S |            | R112  | 124T  |            | R168  | 144N |            | U14   | 66D  |            |       |      |            |
| 5   | 20S |            | R113  | 122T  |            | R169  | 140S |            |       | 66E  |            |       |      |            |
| 6   | 22T |            | R114  | 120U  |            | R170  | 141T |            |       | 69E  |            |       |      |            |
| 7   | 23U |            | R115  | 127S  |            | R171  | 142T |            |       | 71K  |            |       |      |            |
| 8   | 26S |            | R116  | 128C  |            | R172  | 140U |            | U15   | 111E |            |       |      |            |
| 9   | 26R |            | R117  | 129C  |            | R173  | 129K |            |       | 114D |            |       |      |            |
| 0   | 24G |            | R118  | 131F  |            | R174  | 129J |            | U16   | 119D |            |       |      |            |
| 1   | 25G |            | R119  | 134D  |            | R175  | 131G |            |       | 122D |            |       |      |            |
| 2   | 28K |            | R120  | 57J   |            | R176  | 131L |            | U17   | 114P |            |       |      |            |
| 3   | 28J |            | R121  | 63L   |            | R177  | 132K |            |       | 119R |            |       |      |            |
| 4   | 31H |            | R122  | 65M   |            | R178  | 133J |            | U18   | 124R |            |       |      |            |
| 5   | 29M |            | R123  | 67L   |            | R179  | 135K |            | U19   | 132D |            |       |      |            |
| 6   | 30M |            | R124  | 67T   |            | R180  | 136L |            | U20   | 130S |            |       |      |            |
| 7   | 32J |            | R125  | 67S   |            | R181  | 137L |            | U21   | 135S |            |       |      |            |
| 8   | 27P |            | R126  | 68U   |            | R182  | 137M |            |       | 51U  |            |       |      |            |
| 9   |     |            |       |       |            |       |      |            |       | 143R |            |       |      |            |

Figure 6-2. Schematic, Computer/Converter (A2)  
(Sheet 1 of 4)



0383-1-24

Figure 6-2. Schematic, Computer/Converter (A2)  
(Sheet 2 of 4)

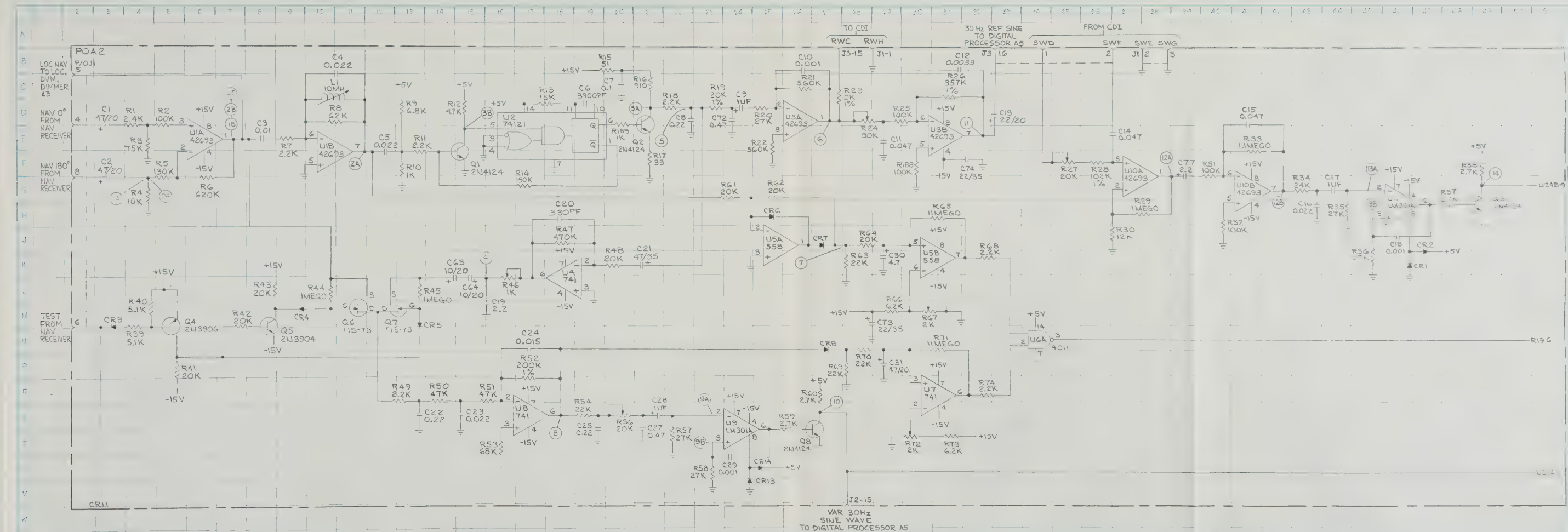


6-4

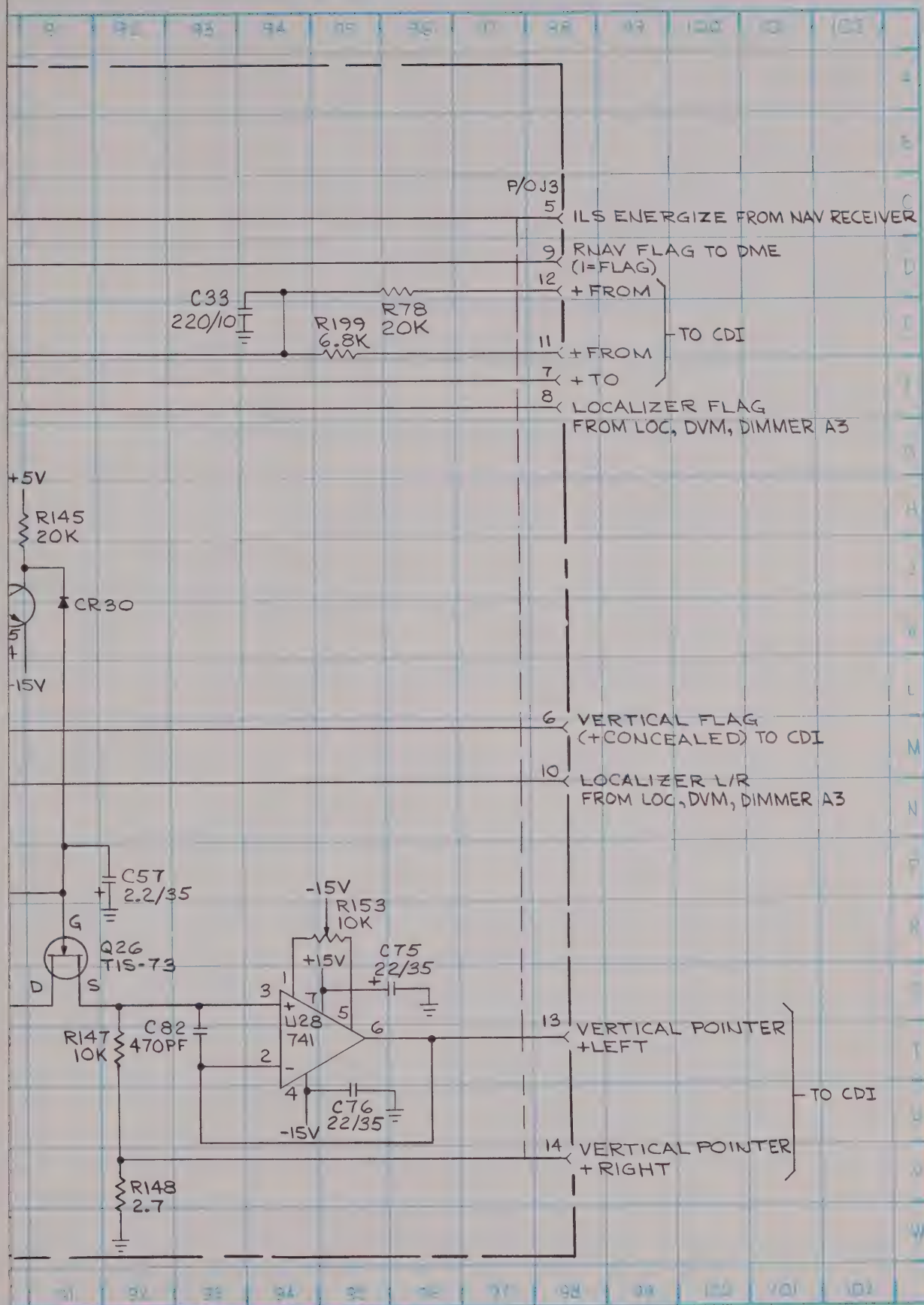


## NOTES:

1. Reference designations are abbreviated. For complete identification, prefix reference designation with assembly designation; for example, A1C1.
2. Capacitor values are in microfarads ( $\mu\text{F}$ ) unless otherwise indicated.
3. Resistor values are in ohms unless otherwise indicated.







0383-1-24

Figure 6-2. Schematic, Computer/Converter (A2)  
(Sheet 3 of 4)





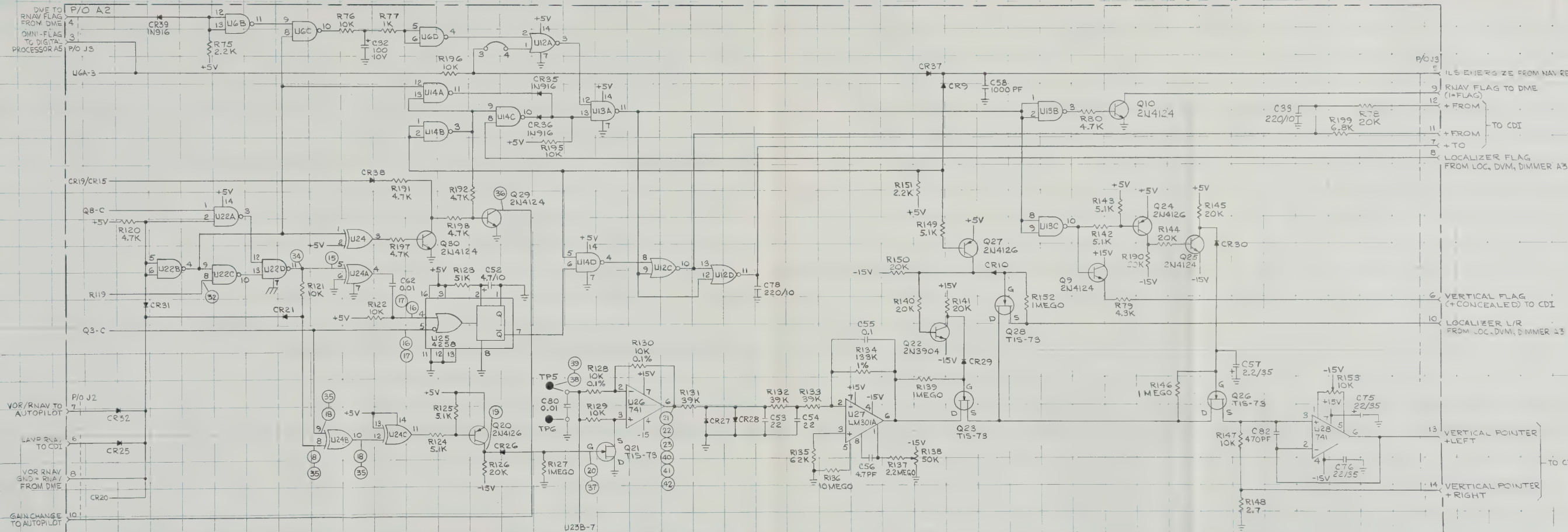
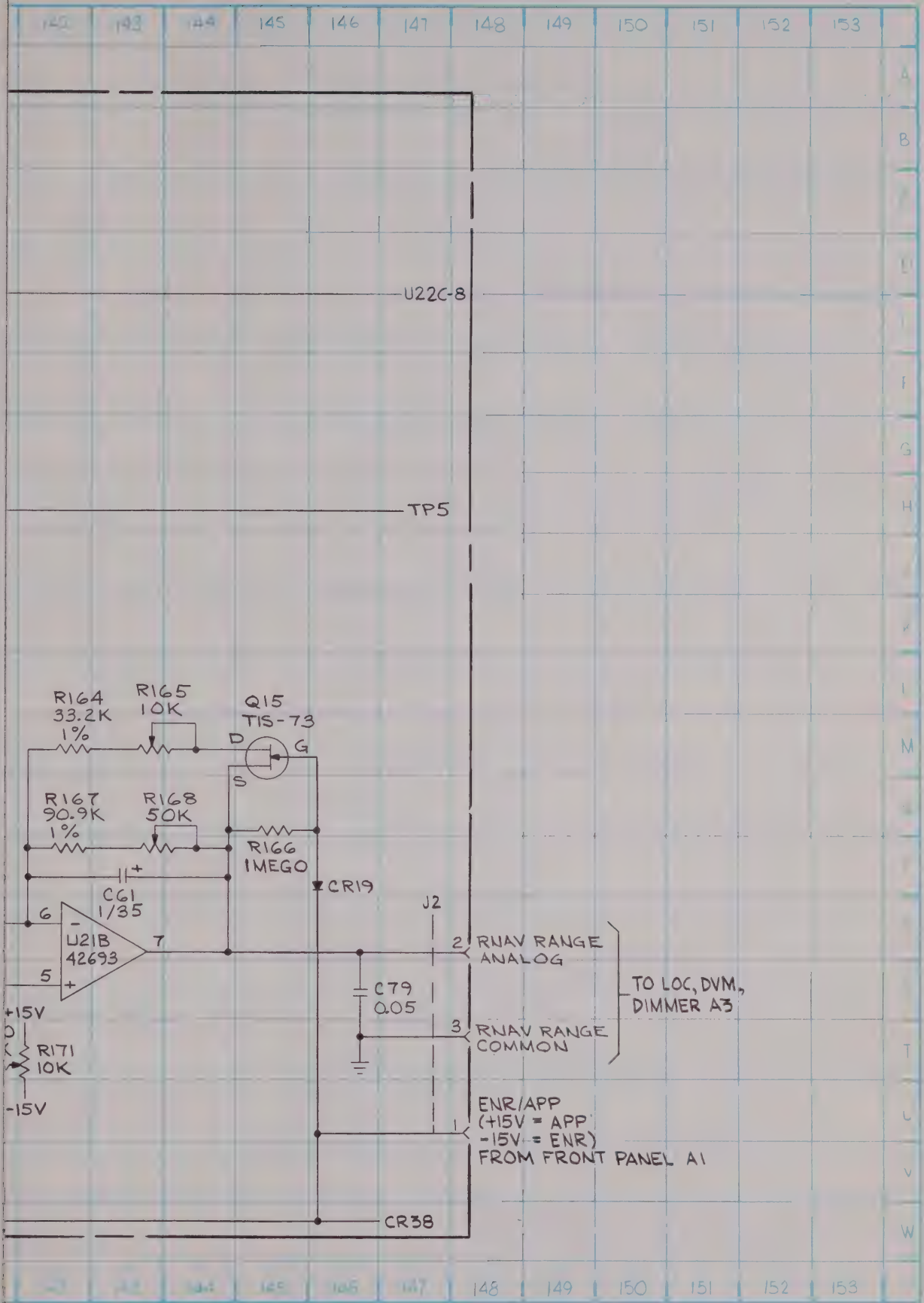


Figure 6-2. Schematic, Computer/Converter (A2)  
(Sheet 3 of 4)





0383-1-24

Figure 6-2. Schematic, Computer/Converter (A2)  
(Sheet 4 of 4)





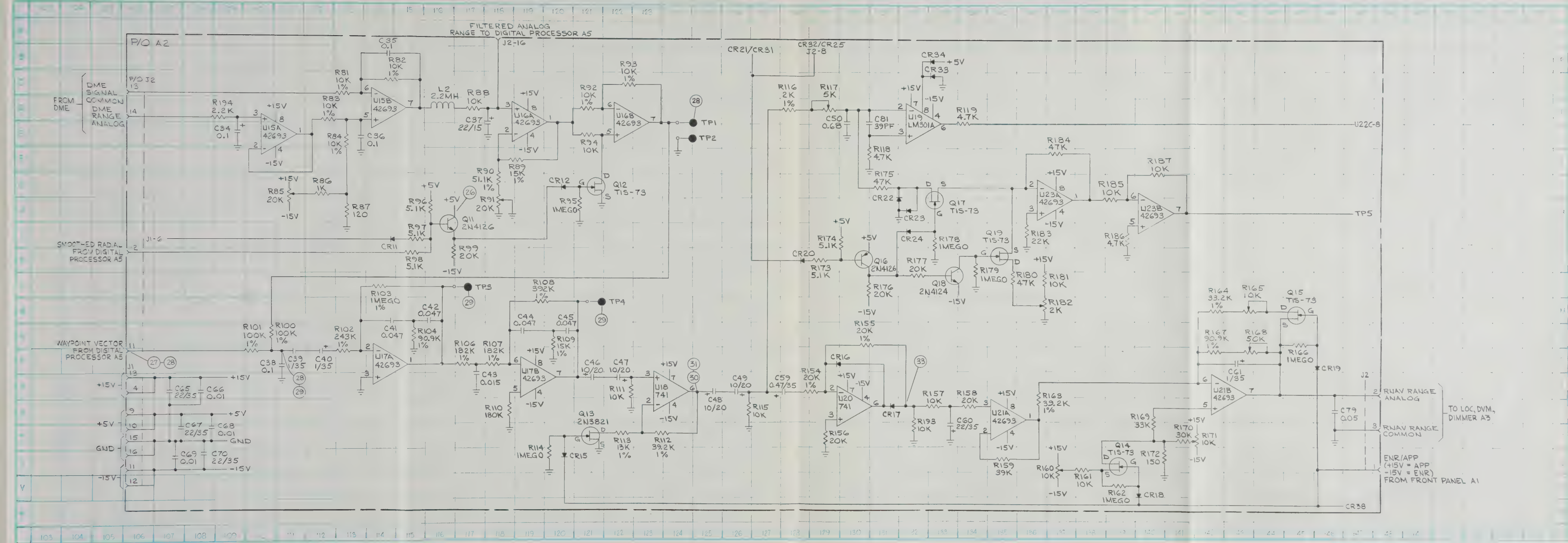
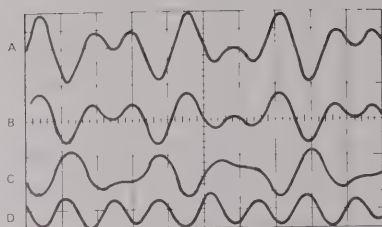
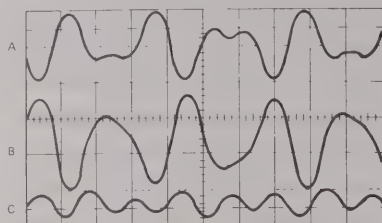


Figure 6-2. Schematic, Computer/Converter (A2)  
(Sheet 4 of 4)

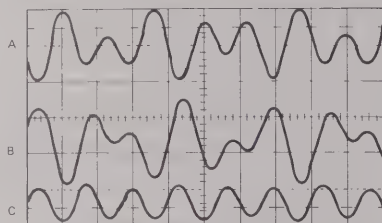
1A-D. NAV Composite (Localizer).  
RNAV in localizer mode  
Oscilloscope settings -  
Channel A: 5 V/cm  
Channel B: 1 V/cm  
Channel C: 10 V/cm  
Channel D: 5 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



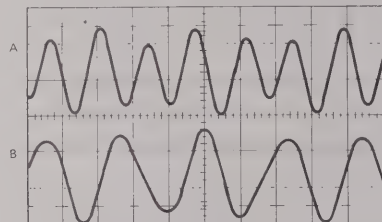
2A-C. NAV Composite (Localizer).  
FULL LEFT OF COURSE  
CDI full left  
Oscilloscope settings -  
Channel A: 5 V/cm  
Channel B: 5 V/cm  
Channel C: 5 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



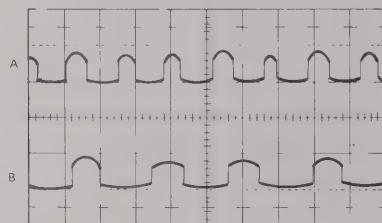
3A-C. NAV Composite (Localizer).  
FULL LEFT OF COURSE  
CDI full left.  
Oscilloscope settings -  
Channel A: 5 V/cm  
Channel B: 5 V/cm  
Channel C: 5 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



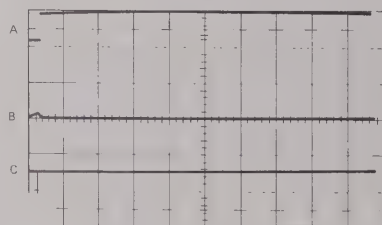
4A. 150 Hz.  
4B. 90 Hz.  
RNAV in localizer mode.  
Oscilloscope settings -  
Channel A: 2 V/cm  
Channel B: 2 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



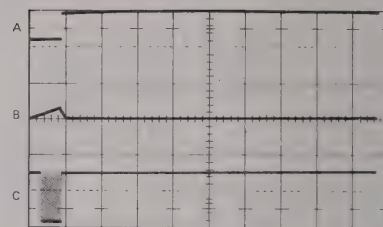
5A. 150 Hz Rectified.  
5B. 90 Hz Rectified.  
RNAV in localizer mode.  
Oscilloscope settings -  
Channel A: 2 V/cm  
Channel B: 2 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



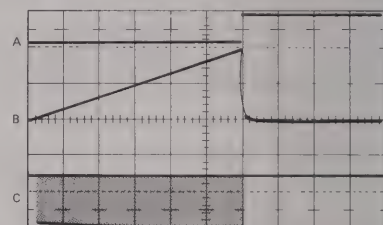
6A. Range Gate.  
6B. Range Ramp.  
6C. RNAV Range (Digital).  
RNAV in RNAV mode (1 mile range).  
Oscilloscope settings -  
Channel A: 5 V/cm  
Channel B: 2 V/cm  
Channel C: 2 V/cm  
Sweep: 0.2 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



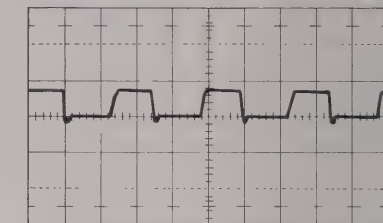
7A. Range Gate.  
7B. Range Ramp.  
7C. RNAV Range (Digital).  
RNAV in RNAV mode (10 mile range).  
Oscilloscope settings -  
Channel A: 5 V/cm  
Channel B: 2 V/cm  
Channel C: 2 V/cm  
Sweep: 0.2 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



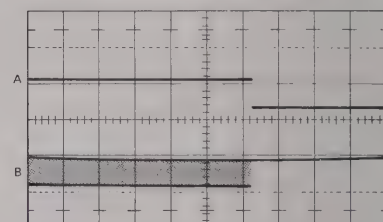
8A. Range Gate.  
8B. Range Ramp.  
8C. RNAV Range (Digital).  
RNAV in RNAV mode (100 mile range).  
Oscilloscope settings -  
Channel A: 5 V/cm  
Channel B: 2 V/cm  
Channel C: 2 V/cm  
Sweep: 0.2 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



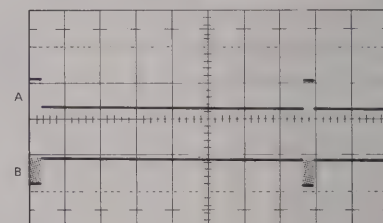
9 DME Clock.  
RNAV in RNAV mode.  
Oscilloscope settings -  
Channel A: 5 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: A only



10A. Range Gate.  
10B. Gated DME Clock.  
RNAV in RNAV mode.  
Oscilloscope settings -  
Channel A: 5 V/cm  
Channel B: 5 V/cm  
Sweep: 0.2 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



11A. Range Gate.  
11B. Gated DME Clock.  
RNAV in RNAV mode.  
Oscilloscope settings -  
Channel A: 5 V/cm  
Channel B: 5 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



44121G

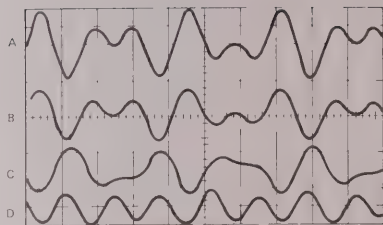
Figure 6-3. Schematic, LOC, DVM, Dimmer (A3), (Sheet 1 of 3)

0383-1-25

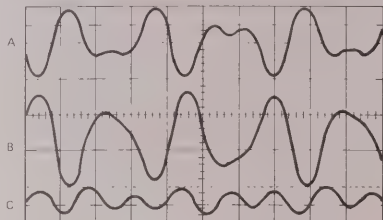
6-11/6-12



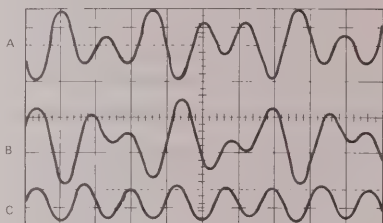
1A-D. NAV Composite (Localizer)  
RNAV in localizer mode  
Oscilloscope settings -  
Channel A: 5 V/cm  
Channel B: 1 V/cm  
Channel C: 10 V/cm  
Channel D: 5 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



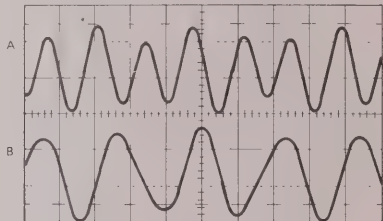
2A-C. NAV Composite (Localizer)  
FULL LEFT OF COURSE  
CDI full right.  
Oscilloscope settings -  
Channel A: 5 V/cm  
Channel B: 5 V/cm  
Channel C: 5 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



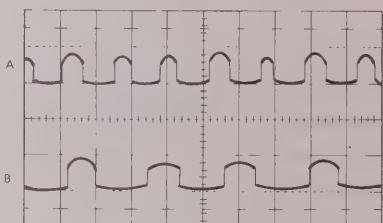
3A C. NAV Composite (Localizer)  
FULL LEFT OF COURSE  
CDI full left.  
Oscilloscope settings -  
Channel A: 5 V/cm  
Channel B: 5 V/cm  
Channel C: 5 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



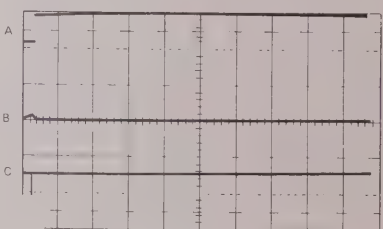
4A. 150 Hz.  
4B. 90 Hz.  
RNAV in localizer mode.  
Oscilloscope settings -  
Channel A: 2 V/cm  
Channel B: 2 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



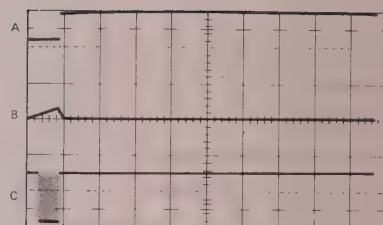
5A. 150 Hz Rectified.  
5B. 90 Hz Rectified.  
RNAV in localizer mode.  
Oscilloscope settings -  
Channel A: 2 V/cm  
Channel B: 2 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



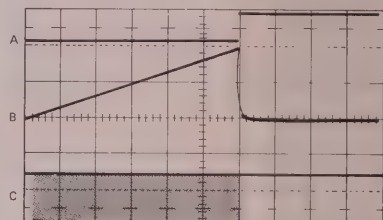
6A. Range Gate.  
6B. Range Ramp.  
6C. RNAV Range (Digital).  
RNAV in RNAV mode (1 mile range).  
Oscilloscope settings -  
Channel A: 5 V/cm  
Channel B: 2 V/cm  
Channel C: 2 V/cm  
Sweep: 0.2 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



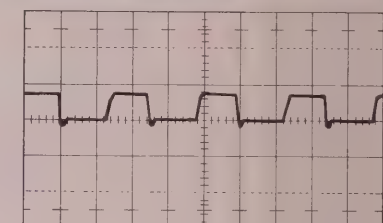
7A. Range Gate.  
7B. Range Ramp.  
7C. RNAV Range (Digital).  
RNAV in RNAV mode (10 mile range).  
Oscilloscope settings -  
Channel A: 5 V/cm  
Channel B: 2 V/cm  
Channel C: 2 V/cm  
Sweep: 0.2 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



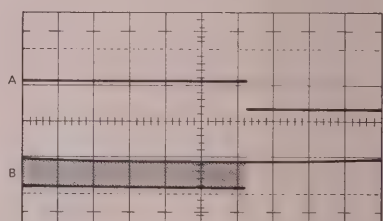
8A. Range Gate.  
8B. Range Ramp.  
8C. RNAV Range (Digital).  
RNAV in RNAV mode (100 mile range).  
Oscilloscope settings -  
Channel A: 5 V/cm  
Channel B: 2 V/cm  
Channel C: 2 V/cm  
Sweep: 0.2 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



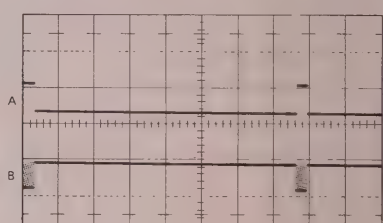
9 DME Clock.  
RNAV in RNAV mode.  
Oscilloscope settings -  
Channel A: 5 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: A only



10A. Range Gate.  
10B. Gated DME Clock.  
RNAV in RNAV mode.  
Oscilloscope settings -  
Channel A: 5 V/cm  
Channel B: 5 V/cm  
Sweep: 0.2 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



11A. Range Gate.  
11B. Gated DME Clock.  
RNAV in RNAV mode.  
Oscilloscope settings -  
Channel A: 5 V/cm  
Channel B: 5 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: chopped



44121G

Figure 6-3. Schematic, LOC, DVM, Dimmer (A3), (Sheet 1 of 3)



| PARTS LOCATION/CHANGE INDEX |     |         |       |     |         |       |     |         |       |     |         |
|-----------------------------|-----|---------|-------|-----|---------|-------|-----|---------|-------|-----|---------|
| DESIG                       | LOC | CHG KEY | DESIG | LOC | CHG KEY | DESIG | LOC | CHG KEY | DESIG | LOC | CHG KEY |
| CR4                         | 12K |         | Q10   | 6P  |         | R52   | 4P  |         |       |     |         |
| CR5                         | 12K |         | Q11   | 10P |         | R53   | 5R  |         |       |     |         |
| CR6                         | 71M |         | Q13   | 7T  |         | R54   | 6N  |         |       |     |         |
| CR7                         | 7F  |         | R16   | 10K |         | R55   | 8P  |         |       |     |         |
| CR8                         | 7G  |         | R17   | 7K  |         | R56   | 7R  |         |       |     |         |
| C1                          | 18S |         | R18   | 7J  |         | R57   | 5T  |         |       |     |         |
| C2                          | 18U |         | R19   | 12H |         | R58   | 55K |         |       |     |         |
| C8                          | 9H  |         | R20   | 7H  |         | R59   | 56L |         |       |     |         |
| C9                          | 8F  |         | R21   | 8H  |         | R60   | 57M |         |       |     |         |
| C10                         |     |         | R22   | 6G  |         | R61   | 58L |         |       |     |         |
| C11                         |     |         | R23   | 10G |         | RT1   | 59M |         |       |     |         |
| C13                         | 75P |         | R24   | 3E  |         | T1    | 60F |         |       |     |         |
| C14                         | 75S |         | R25   | 7E  |         | T2    | 60H |         |       |     |         |
| C16                         | 56M |         | R26   | 11F |         | U4    | 4E  |         |       |     |         |
| C17                         | 58F |         | R27   | 9B  |         | U5    | 8C  |         |       |     |         |
| C18                         | 58J |         | R29   |     |         | U6    | 12E |         |       |     |         |
| C19                         | 57R |         | R31   | 19K |         |       | 12C |         |       |     |         |
| C20                         | 57V |         | R32   | 56H |         |       | 15D |         |       |     |         |
| C22                         | 70J |         | R33   | 56L |         |       | 14E |         |       |     |         |
| C23                         | 72F |         | R34   | 57K |         | U9    | 17D |         |       |     |         |
| C24                         | 71G |         | R36   | 58N |         | U10   |     |         |       |     |         |
| C25                         | 74F |         | R37   | 81G |         | U12   | 61C |         |       |     |         |
| C26                         | 9M  |         | R38   | 67F |         | U13   | 63F |         |       |     |         |
| C27                         | 11M |         | R39   | 66H |         |       | 67G |         |       |     |         |
| C28                         | 9E  |         | R40   | 67M |         | U15   | 76F |         |       |     |         |
| C29                         | 14K |         | R41   | 67N |         |       | 68M |         |       |     |         |
| C30                         | 18P |         | R42   | 67R |         | VR1   | 12L |         |       |     |         |
| C31                         |     |         | R43   | 68F |         | VR2   | 5R  |         |       |     |         |
| C32                         | 5F  |         | R44   | 67K |         |       |     |         |       |     |         |
| DS1                         | 4R  |         | R45   | 69G |         |       |     |         |       |     |         |
| DS2                         | 4R  |         | R46   | 69K |         |       |     |         |       |     |         |
| Q6                          | 10H |         | R47   | 70H |         |       |     |         |       |     |         |
| Q7                          | 11G |         | R48   | 71K |         |       |     |         |       |     |         |
| Q8                          | 58K |         | R49   | 70M |         |       |     |         |       |     |         |
| Q9                          | 75M |         | R50   | 73K |         |       |     |         |       |     |         |

CHG KEY: A=ADDED  
C=CHANGE  
D=DELETED

L=LOCATION CHANGE  
V-VOLTAGE/WAVEFORM  
W=WIRE CHANGE

## NOTES:

- Reference designations are abbreviated. For complete identification, prefix reference designation with assembly designation; for example, A1C1.
- Capacitor values are in microfarads ( $\mu$ F) unless otherwise indicated.
- Resistor values are in ohms unless otherwise indicated.

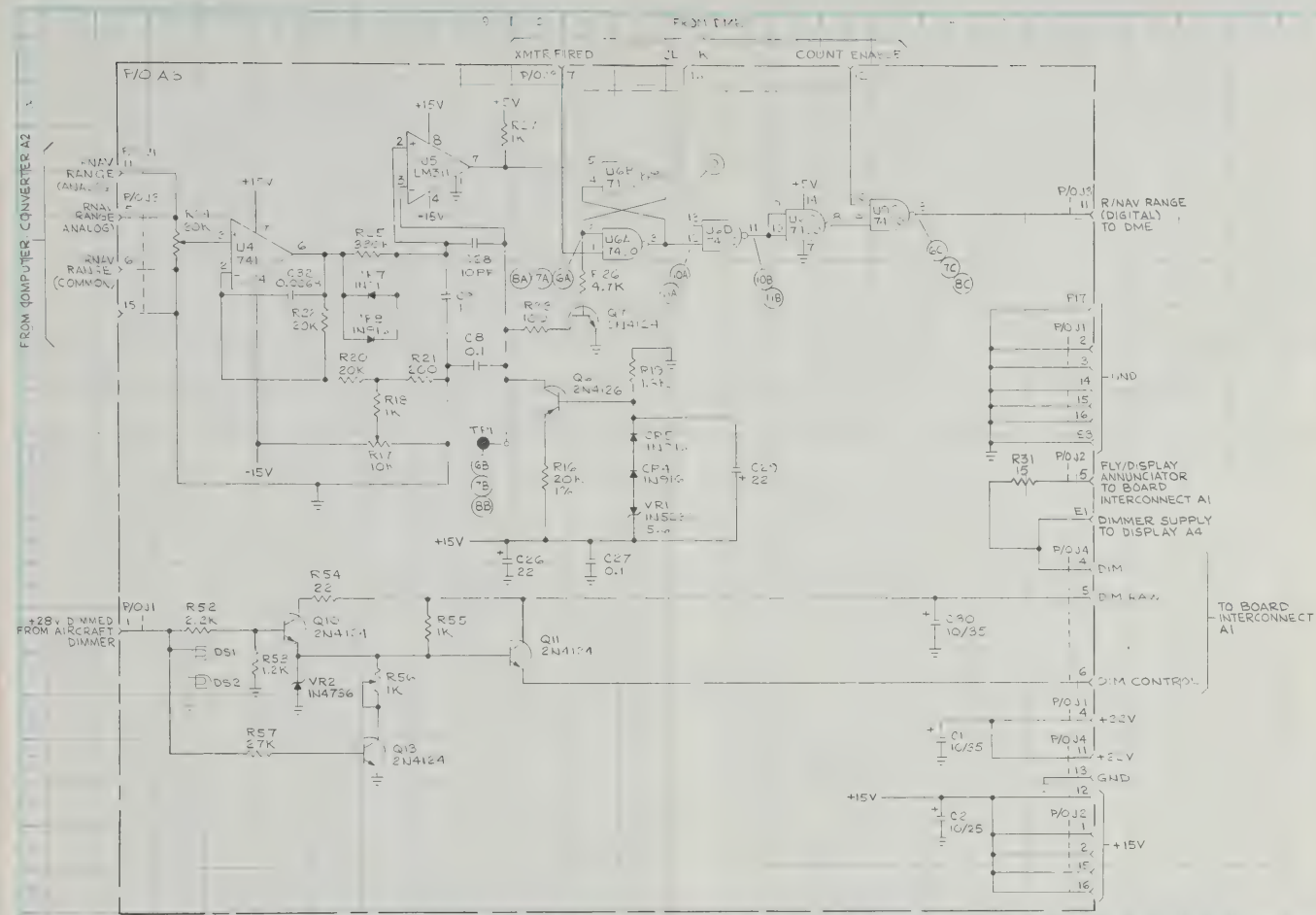
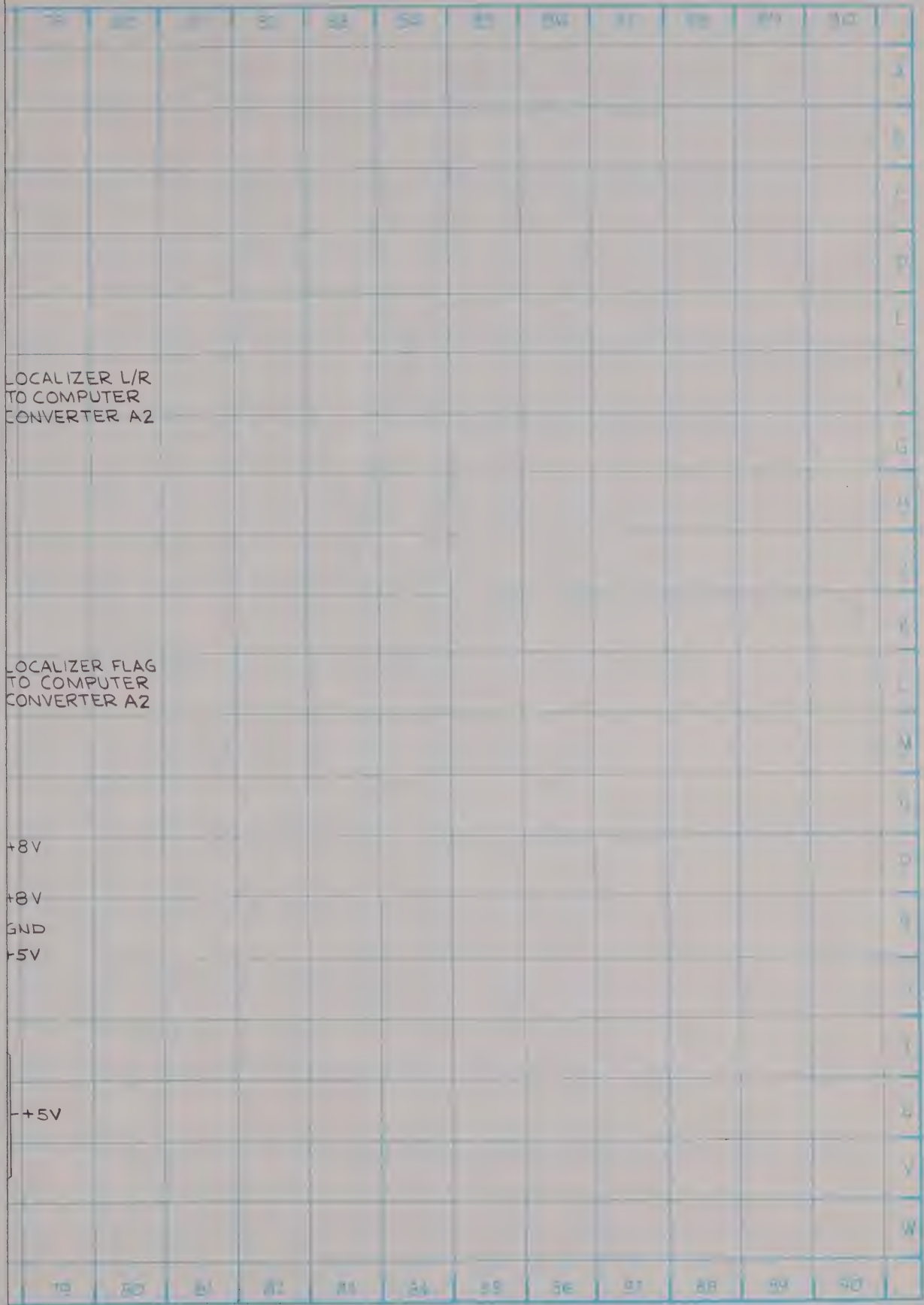


Figure 6-3. Schematic, LOC, DVM, Dimmer (A3)  
(Sheet 2 of 3)





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Figure 6-3. Schematic, LOC, DVM, Dimmer (A3)  
(Sheet 3 of 3)





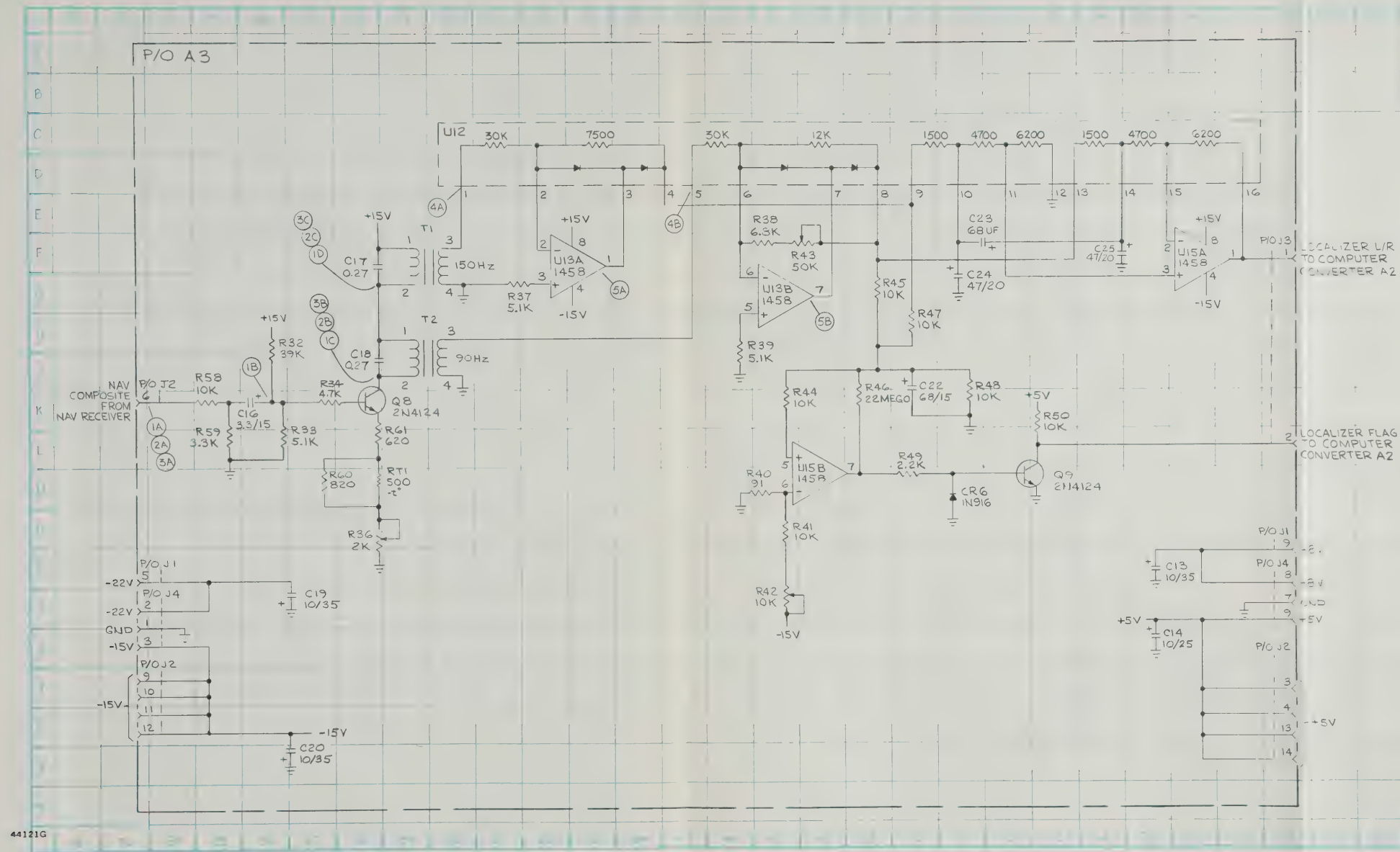
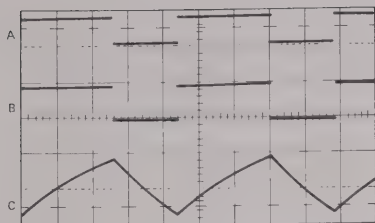
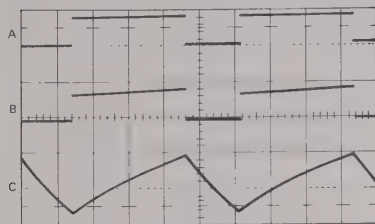


Figure 6-3. Schematic, LOC, DVM, Dimmer (A3)  
(Sheet 3 of 3)

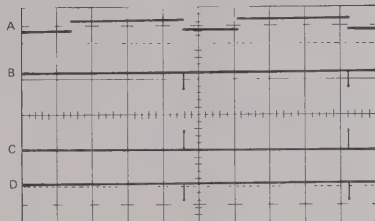
1A. Flash Annunciator.  
1B. Timer Discharge.  
1C. Trigger-Threshold.  
Oscilloscope settings –  
Channel A: 2 V/cm  
Channel B: 5 V/cm  
Channel C: 1 V/cm  
Sweep: 0.2 sec/cm  
Trigger: external AC SLOW  
Mode: chopped



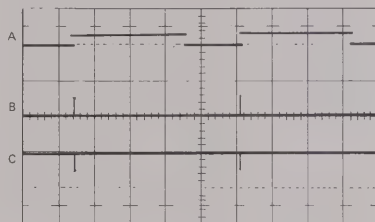
2A. Timer Output.  
2B. Timer Discharge.  
2C. Trigger-Threshold.  
Oscilloscope settings –  
Channel A: 2 V/cm  
Channel B: 5 V/cm  
Channel C: 1 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: chopped



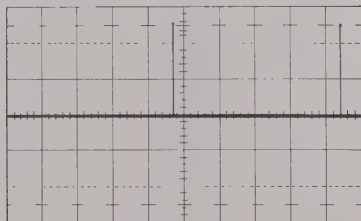
3A. Trigger Input.  
3B. Read/Latch Memory Fly Word.  
3C. Inhibit Memory Display Word.  
Oscilloscope settings –  
Channel A: 10 V/cm  
Channel B: 10 V/cm  
Channel C: 10 V/cm  
Channel D: 10 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: chopped



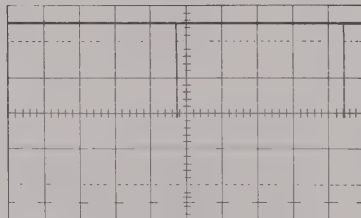
4A. Trigger Input  
4B. Write (ungated)  
4C. Timer Threshold.  
Oscilloscope settings –  
Channel A: 10 V/cm  
Channel B: 10 V/cm  
Channel C: 10 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: chopped



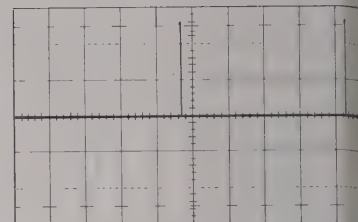
5 Write.  
RNAV XFER pressed.  
Oscilloscope settings –  
Channel A: 2 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: A only



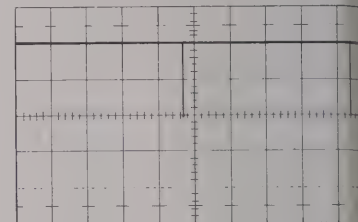
6 Word 1 (Inhibit)  
RNAV DISPLAY = 2, FLY = 2.  
Oscilloscope settings –  
Channel A: 2 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: A only



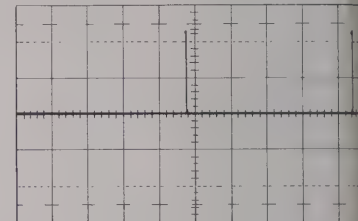
7 Word 1 (Read)  
RNAV DISPLAY = 1, FLY = 2  
Oscilloscope settings –  
Channel A: 2 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: A only



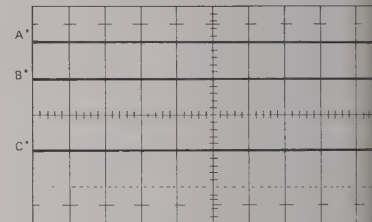
8 Word 2 (Inhibit)  
RNAV DISPLAY = 1, FLY = 2  
Oscilloscope settings –  
Channel A: 2 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: A only



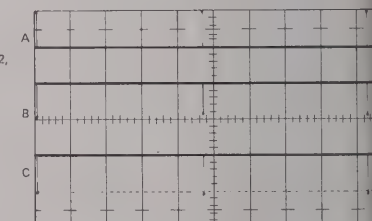
9 Word 2 (Read)  
RNAV DISPLAY = 2, FLY = 1  
Oscilloscope settings –  
Channel A: 2 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: A only



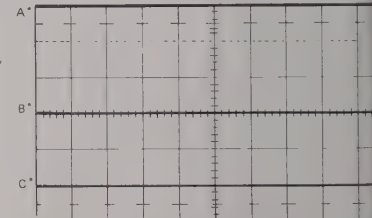
10A. Write (Inhibited)  
10B. Word 1 (Read)  
10C. 100 Miles (Active)  
RNAV DISPLAY = 1, FLY = 1,  
memory 1 = 100 nm, memory 2 = 0 nm.  
Oscilloscope settings –  
Channel A: 5 V/cm  
Channel B: 5 V/cm  
Channel C: 5 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: chopped



11A. Write (pulses enable).  
11B. Word 1 (pulses inhibit).  
11C. 100 Miles (active).  
RNAV XFER pressed, DISPLAY = 1, FLY = 2,  
memory 1 = 100 nm, memory 2 = 0 nm.  
Oscilloscope settings –  
Channel A: 5 V/cm  
Channel B: 5 V/cm  
Channel C: 5 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: chopped



12A. Word 1 (enabled).  
12B. Word 1 (pulses inhibit).  
12C. 100 Miles (inactive).  
DISPLAY = 2, FLY = 2, memory 1 = 100 nm,  
memory 2 = 0 nm.  
Channel A: 5 V/cm  
Channel B: 5 V/cm  
Channel C: 5 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: chopped

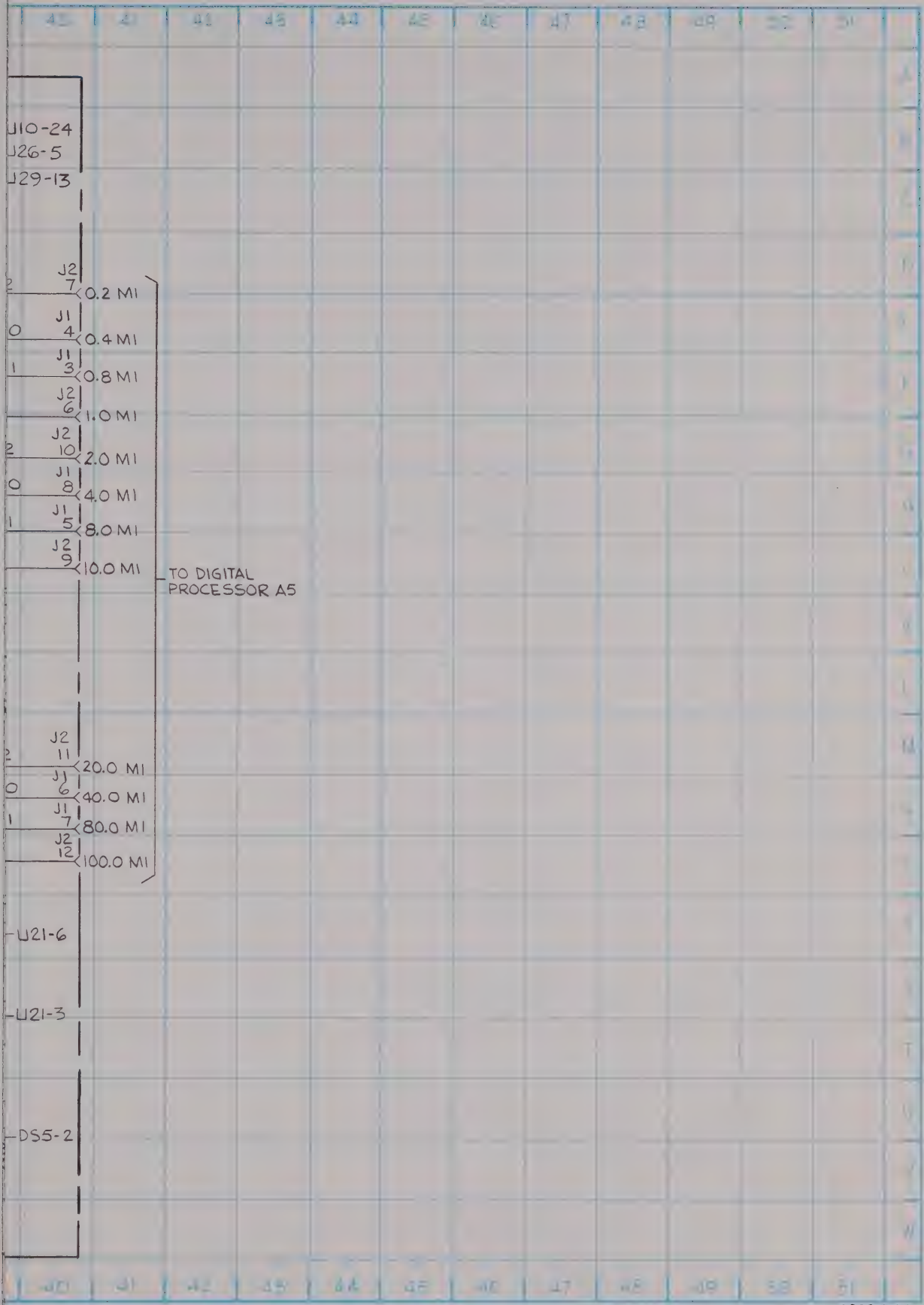


44141C

\*DC levels.

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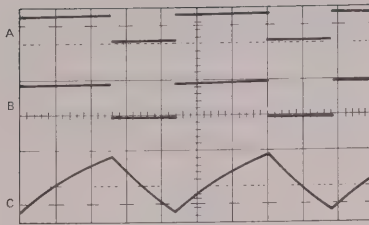
Figure 6-4. Schematic, Display (A4), (Sheet 1 of 3)



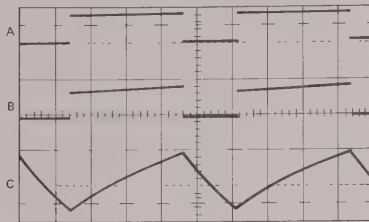
0383-1-26

Figure 6-4. Schematic, Display (A4)  
(Sheet 2 of 3)

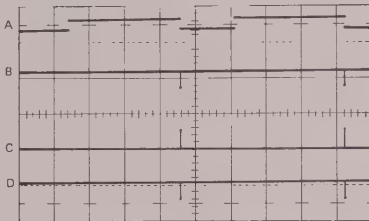
1A. Flash Annunciator.  
1B. Timer Discharge.  
1C. Trigger-Threshold.  
Oscilloscope settings –  
Channel A: 2 V/cm  
Channel B: 5 V/cm  
Channel C: 1 V/cm  
Sweep: 0.2 sec/cm  
Trigger: external AC SLOW  
Mode: chopped



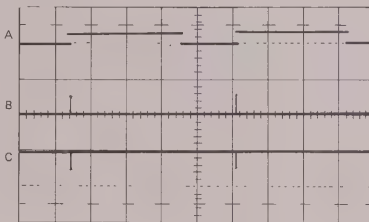
2A. Timer Output.  
2B. Timer Discharge.  
2C. Trigger-Threshold.  
Oscilloscope settings –  
Channel A: 2 V/cm  
Channel B: 5 V/cm  
Channel C: 1 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: chopped



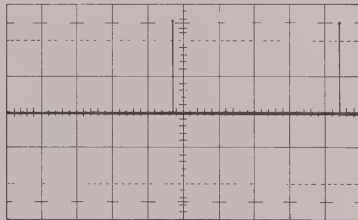
3A. Trigger Input.  
3B. Timer Discharge.  
3C. Read/Latch Memory Fly Word.  
3D. Inhibit Memory Display Word.  
Oscilloscope settings –  
Channel A: 10 V/cm  
Channel B: 10 V/cm  
Channel C: 10 V/cm  
Channel D: 10 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: chopped



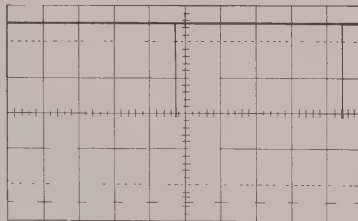
4A. Trigger Input.  
4B. Write (ungated).  
4C. Timer Threshold.  
Oscilloscope settings –  
Channel A: 10 V/cm  
Channel B: 10 V/cm  
Channel C: 10 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: chopped



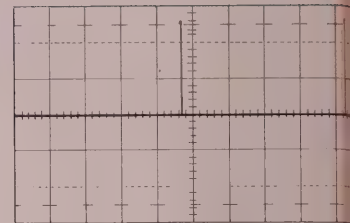
5. Write.  
RNAV XFER pressed.  
Oscilloscope settings –  
Channel A: 2 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: A only



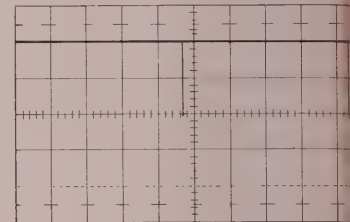
6 Word 1 (Inhibit)  
RNAV DISPLAY = 2, FLY = 2,  
Oscilloscope settings –  
Channel A: 2 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: A only



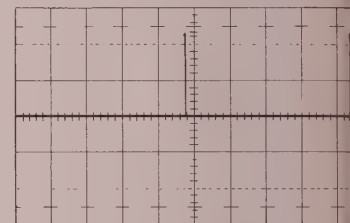
7 Word 1 (Read)  
RNAV DISPLAY = 1, FLY = 2  
Oscilloscope settings –  
Channel A: 2 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: A only



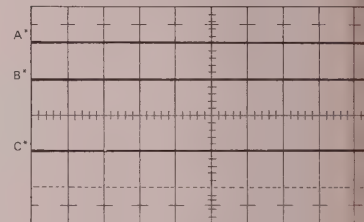
8 Word 2 (Inhibit)  
RNAV DISPLAY = 1, FLY = 2  
Oscilloscope settings –  
Channel A: 2 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: A only



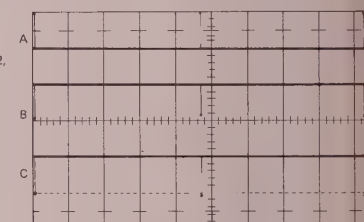
9 Word 2 (Read)  
RNAV DISPLAY = 2, FLY = 1  
Oscilloscope settings –  
Channel A: 2 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: A only



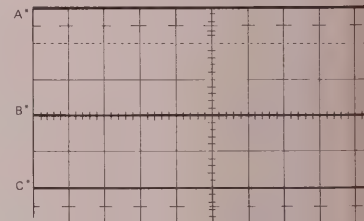
10A. Write (Inhibited)  
10B. Word 1 (Read)  
10C. 100 Miles (Active)  
RNAV DISPLAY = 1, FLY = 1,  
memory 1 = 100 nm, memory 2 = 0 nm  
Oscilloscope settings –  
Channel A: 5 V/cm  
Channel B: 5 V/cm  
Channel C: 5 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: chopped



11A. Write (pulses enable).  
11B. Word 1 (pulses inhibit).  
11C. 100 Miles (active).  
RNAV XFER pressed, DISPLAY = 1, FLY = 2,  
memory 1 = 100 nm, memory 2 = 0 nm.  
Oscilloscope settings –  
Channel A: 5 V/cm  
Channel B: 5 V/cm  
Channel C: 5 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: chopped



12A. Word 1 (enabled).  
12B. Word 1 (pulses inhibit).  
12C. 100 Miles (inactive).  
DISPLAY = 2, FLY = 2, memory 1 = 100 nm,  
memory 2 = 0 nm.  
Channel A: 5 V/cm  
Channel B: 5 V/cm  
Channel C: 5 V/cm  
Sweep: 2 msec/cm  
Trigger: external AC SLOW  
Mode: chopped



44141C

\*DC levels.

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Figure 6-4. Schematic, Display (A4), (Sheet 1 of 3)



| DESIG | LOC | CHG KEY | DESIG | LOC | CHG KEY | DESIG | LOC | CHG KEY | DESIG | LOC | CHG KEY |
|-------|-----|---------|-------|-----|---------|-------|-----|---------|-------|-----|---------|
| CR1   | 6G  |         | Q1    | 10E |         | U18   | 28R |         |       |     |         |
| CR2   | 7G  |         | Q2    | 26R |         | U19   | 31R |         |       |     |         |
| CR3   | 8G  |         | Q3    | 84S |         | U20   | 34R |         |       |     |         |
| CR4   | 9G  |         | Q4    | 6C  |         | U21   | 65P |         |       |     |         |
| CR6   | 10G |         | R1    | 4S  |         | U22   | 68P |         |       |     |         |
| CR7   | 26S |         | R2    | 4T  |         | U23   | 71P |         |       |     |         |
| CR8   | 85U |         | R3    | 4D  |         | U24   | 74P |         |       |     |         |
| CR9   | 7A  |         | R4    | 4E  |         | U25   | 81R |         |       |     |         |
| CR10  | 8R  |         | R5    | 7R  |         | U26   | 83C |         |       |     |         |
| C1    | 3U  |         | R6    | 7W  |         | U27   | 83E |         |       |     |         |
| C2    | 4G  |         | R7    | 19T |         | U28   | 83K |         |       |     |         |
| C3    | 8R  |         | R8    | 19U |         | U29   | 83N |         |       |     |         |
| C4    | 8V  |         | R9    | 9F  |         | U30   | 38E |         |       |     |         |
| C5    | 21C |         | R10   | 10E |         | U31   | 38H |         |       |     |         |
| C6    | 19C |         | R11   | 26P |         | U32   | 38N |         |       |     |         |
| C7    | 4V  |         | R12   | 80P |         | U33   | 5J  |         |       |     |         |
| C8    | 9B  |         | R13   | 82S |         | U34   | 54B |         |       |     |         |
| C9    | 5G  |         | R14   | 83S |         | U35   | 18D |         |       |     |         |
| C10   | 13V |         | R15   | 5B  |         |       |     |         |       |     |         |
| DS1   | 25T |         | R16   | 5C  |         |       |     |         |       |     |         |
| DS2   | 28T |         | R17   | 7C  |         |       |     |         |       |     |         |
| DS3   | 31T |         | U1    | 5S  |         |       |     |         |       |     |         |
| DS4   | 34T |         | U2    | 5E  |         |       |     |         |       |     |         |
| DS5   | 65S |         | U3    | 7T  |         |       |     |         |       |     |         |
| DS6   | 68S |         | U4    | 6E  |         |       |     |         |       |     |         |
| DS7   | 71S |         | U5    | 8E  |         |       |     |         |       |     |         |
| DS8   | 74S |         |       | 6H  |         |       |     |         |       |     |         |
| DS9   | 76S |         |       | 7H  |         |       |     |         |       |     |         |
| J1    |     |         |       | 8H  |         |       |     |         |       |     |         |
| J2    |     |         |       | 9H  |         |       |     |         |       |     |         |
| J3    |     |         |       | 14U |         |       |     |         |       |     |         |
| J4    |     |         |       | 16U |         |       |     |         |       |     |         |
| J5    |     |         |       | 21T |         |       |     |         |       |     |         |

CHG KEY: A=ADDED  
C=CHANGE  
D=DELETED

L=LOCATION CHANGE  
V=VOLTAGE WAVEFORM  
W=WIRE CHANGE

## NOTES:

- Reference designations are abbreviated. For complete identification, prefix reference designation with assembly designation; for example, A1C1.
- Capacitor values are in microfarads ( $\mu$ F) unless otherwise indicated.
- Resistor values are in ohms unless otherwise indicated.

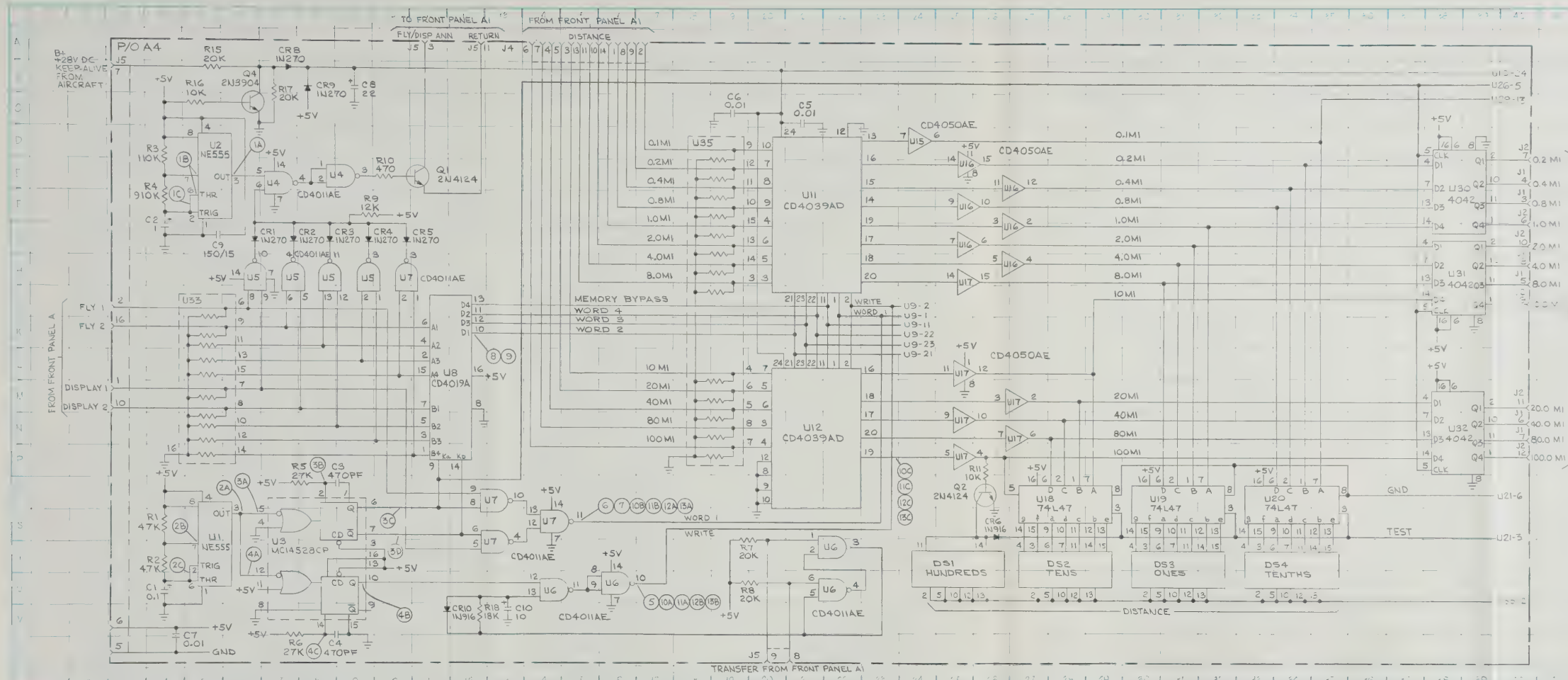


Figure G-4. Schematic, Display (A4)  
(Sheet 2 of 3)



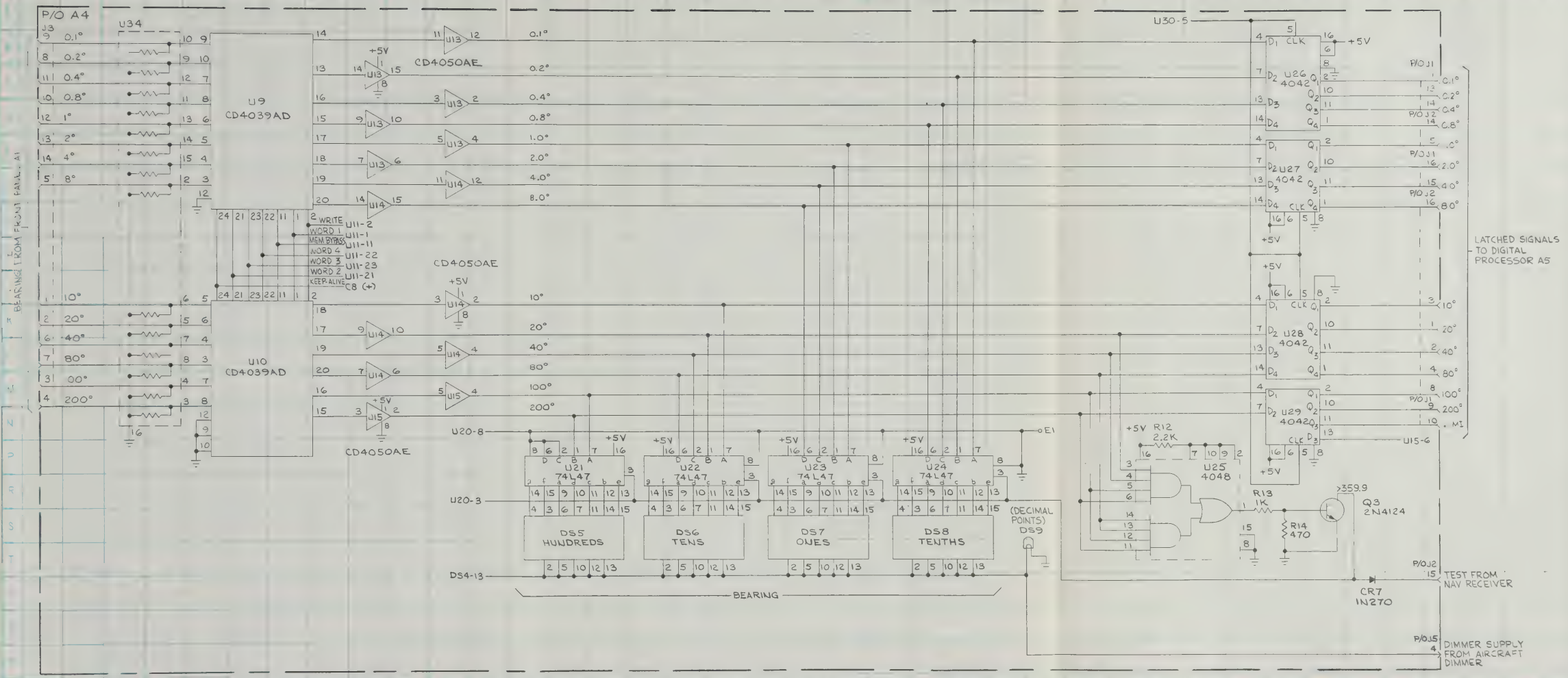


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Figure 6-4. Schematic, Display (A4)  
(Sheet 3 of 3)







RESISTOR NETWORK  
TYPICAL FOR:  
U33, U34, AND U35  
ALL RESISTOR VALUES  
ARE 20K OHMS

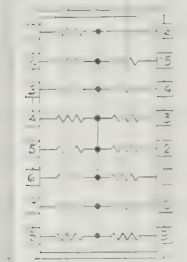
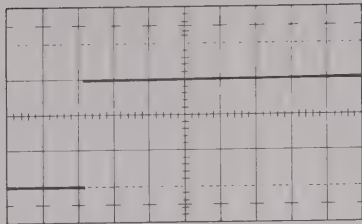
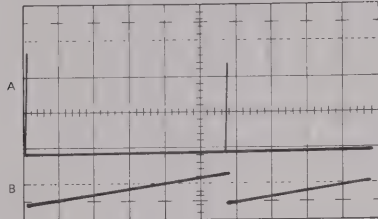


Figure 6-4. Schematic, Display (A4)  
(Sheet 3 of 3)

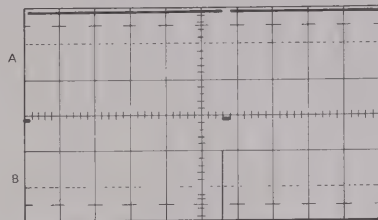
50 Up/Down Clock to Ctr #1.  
Oscilloscope settings –  
Channel A: 5 V/cm  
Sweep: 10 msec/cm  
Trigger: internal AC SLOW  
Mode: A only



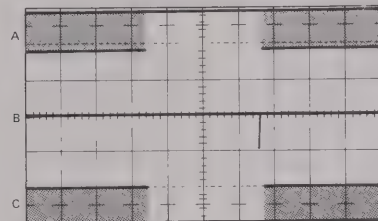
51A. Comparator Output.  
51B. Ramp In (from timer).  
Oscilloscope settings –  
Channel A: 10 V/cm  
Channel B: 5 V/cm  
Sweep: 0.1 sec/cm  
Trigger: internal AC SLOW  
Mode: Chopped



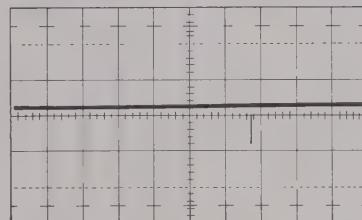
52A. Up/Down Clock to Ctr #1.  
52B. Comparator Output.  
Oscilloscope settings –  
Channel A: 5 V/cm  
Channel B: 5 V/cm  
Sweep: 0.1 sec/cm  
Trigger: internal AC SLOW  
Mode: Chopped



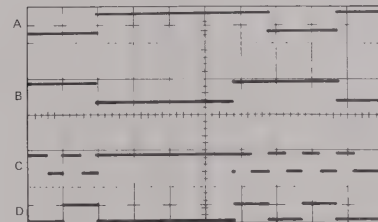
53A,C. Clocks (1°).  
53B. Clock (Up/Down).  
A5J1-6 connected to +5V  
Oscilloscope settings –  
Channel A: 5 V/cm  
Channel B: 5 V/cm  
Channel C: 5 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: Chopped



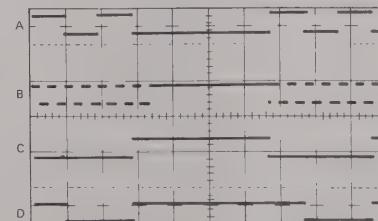
54A–D. Counter #1 to 332.8° Detector.  
Oscilloscope settings –  
Channel A: 5 V/cm  
Sweep: 2 msec/cm  
Trigger: internal AC SLOW  
Mode: A only



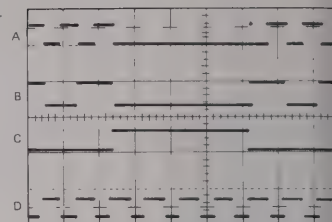
55A–D. Counter #1 Outputs.  
Oscilloscope settings –  
Channel A: 10 V/cm  
Channel B: 10 V/cm  
Channel C: 10 V/cm  
Channel D: 10 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: Chopped



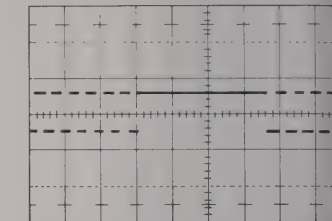
56A–D. Counter #1 Outputs.  
Oscilloscope settings –  
Channel A: 10 V/cm  
Channel B: 10 V/cm  
Channel C: 10 V/cm  
Channel D: 10 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: Chopped



57A–D. Counter #1 to Less than 25.6° Detector.  
Oscilloscope settings –  
Channel A: 10 V/cm  
Channel B: 10 V/cm  
Channel C: 10 V/cm  
Channel D: 10 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: Chopped



58 Counter #1 to 12.8° Detector.  
Oscilloscope settings –  
Channel A: 5 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: A only



59A–D. Output from Counter #1.  
Oscilloscope settings –  
Channel A: 10 V/cm  
Channel B: 10 V/cm  
Channel C: 10 V/cm  
Channel D: 10 V/cm  
Sweep: 5 msec/cm  
Trigger: internal AC SLOW  
Mode: Chopped

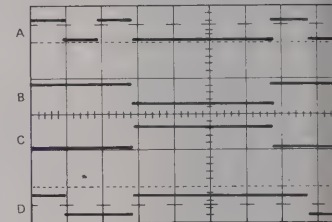


Figure 6-5. Schematic, Digital Processor (A5), (Sheet 1 of 4)

| DESIG        | LOC  | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |   |
|--------------|------|----|----|----|----|----|----|----|----|----|----|----|----|---|
| CR1          | 62F  |    |    |    |    |    |    |    |    |    |    |    |    | A |
| CR2          | 72E  |    |    |    |    |    |    |    |    |    |    |    |    |   |
| CR3          | 7F   |    |    |    |    |    |    |    |    |    |    |    |    |   |
| CR4          | 7G   |    |    |    |    |    |    |    |    |    |    |    |    | B |
| CR5          | 106S |    |    |    |    |    |    |    |    |    |    |    |    |   |
| CR6          | 145J |    |    |    |    |    |    |    |    |    |    |    |    |   |
| CR7          |      |    |    |    |    |    |    |    |    |    |    |    |    | C |
| CR8          | 99K  |    |    |    |    |    |    |    |    |    |    |    |    |   |
| CR9          | 98K  |    |    |    |    |    |    |    |    |    |    |    |    |   |
| CR10         |      |    |    |    |    |    |    |    |    |    |    |    |    | D |
| CR11         |      |    |    |    |    |    |    |    |    |    |    |    |    |   |
| CR12         |      |    |    |    |    |    |    |    |    |    |    |    |    | E |
| CR13         |      |    |    |    |    |    |    |    |    |    |    |    |    |   |
| CR14         |      |    |    |    |    |    |    |    |    |    |    |    |    |   |
| CR15         |      |    |    |    |    |    |    |    |    |    |    |    |    |   |
| CR16         |      |    |    |    |    |    |    |    |    |    |    |    |    |   |
| CR17         |      |    |    |    |    |    |    |    |    |    |    |    |    |   |
| CR18         |      |    |    |    |    |    |    |    |    |    |    |    |    |   |
| CR19         |      |    |    |    |    |    |    |    |    |    |    |    |    |   |
| CR20         |      |    |    |    |    |    |    |    |    |    |    |    |    | G |
| C1           | 7F   |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C2           | 69F  |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C3           | 74F  |    |    |    |    |    |    |    |    |    |    |    |    | H |
| C4           | 75E  |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C5           | 76D  |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C6           | 58L  |    |    |    |    |    |    |    |    |    |    |    |    | I |
| C7           | 6J   |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C8           | 16F  |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C9           | 17M  |    |    |    |    |    |    |    |    |    |    |    |    | K |
| C10          | 91L  |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C11          | 3P   |    |    |    |    |    |    |    |    |    |    |    |    | L |
| C12          | 4P   |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C13          | 3R   |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C14          | 4R   |    |    |    |    |    |    |    |    |    |    |    |    | M |
| C15          | 4S   |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C16          | 4S   |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C17          | 64M  |    |    |    |    |    |    |    |    |    |    |    |    | N |
| C18          | 62T  |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C19          | 63T  |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C20          | 64T  |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C21          | 62U  |    |    |    |    |    |    |    |    |    |    |    |    | P |
| C22          | 65R  |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C23          | 72R  |    |    |    |    |    |    |    |    |    |    |    |    | R |
| C24          | 28N  |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C25          | 28T  |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C26          | 112P |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C27          | 115J |    |    |    |    |    |    |    |    |    |    |    |    | S |
| C28          | 115L |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C29          | 118J |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C30          | 118M |    |    |    |    |    |    |    |    |    |    |    |    | T |
| C31          | 131J |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C32          | 134M |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C33          | 134R |    |    |    |    |    |    |    |    |    |    |    |    | U |
| C34          | 134P |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C35          | 62D  |    |    |    |    |    |    |    |    |    |    |    |    | V |
| C36          | 67C  |    |    |    |    |    |    |    |    |    |    |    |    |   |
| KEY: A=ADDED |      |    |    |    |    |    |    |    |    |    |    |    |    |   |
| C=CHANG      |      |    |    |    |    |    |    |    |    |    |    |    |    | W |
| D=DELET      |      |    |    |    |    |    |    |    |    |    |    |    |    |   |
|              |      | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |   |

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Figure 6-5. Schematic, Digital Processor (A5)  
(Sheet 2 of 4)



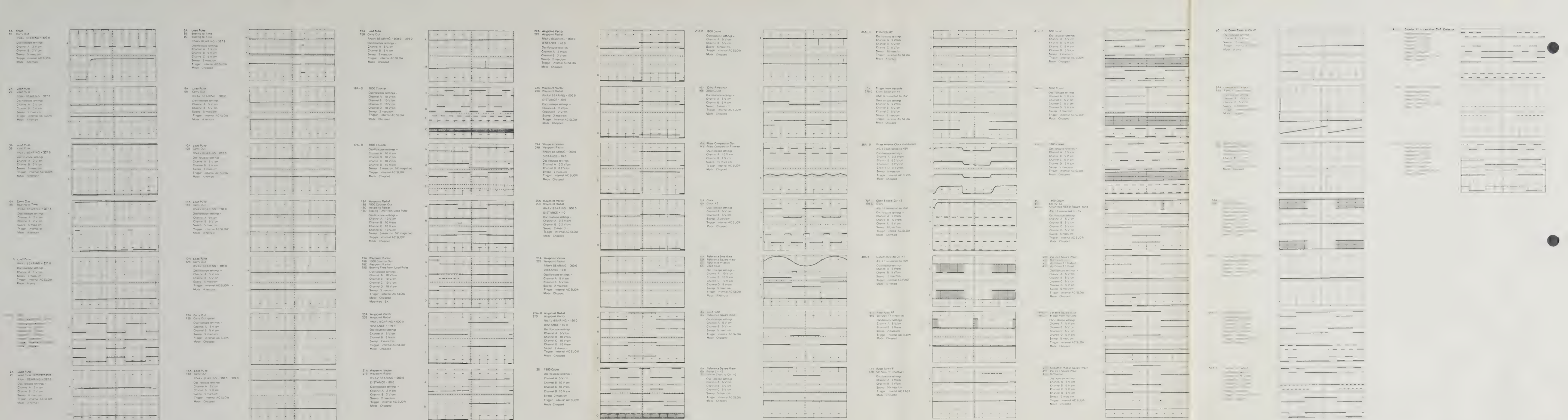


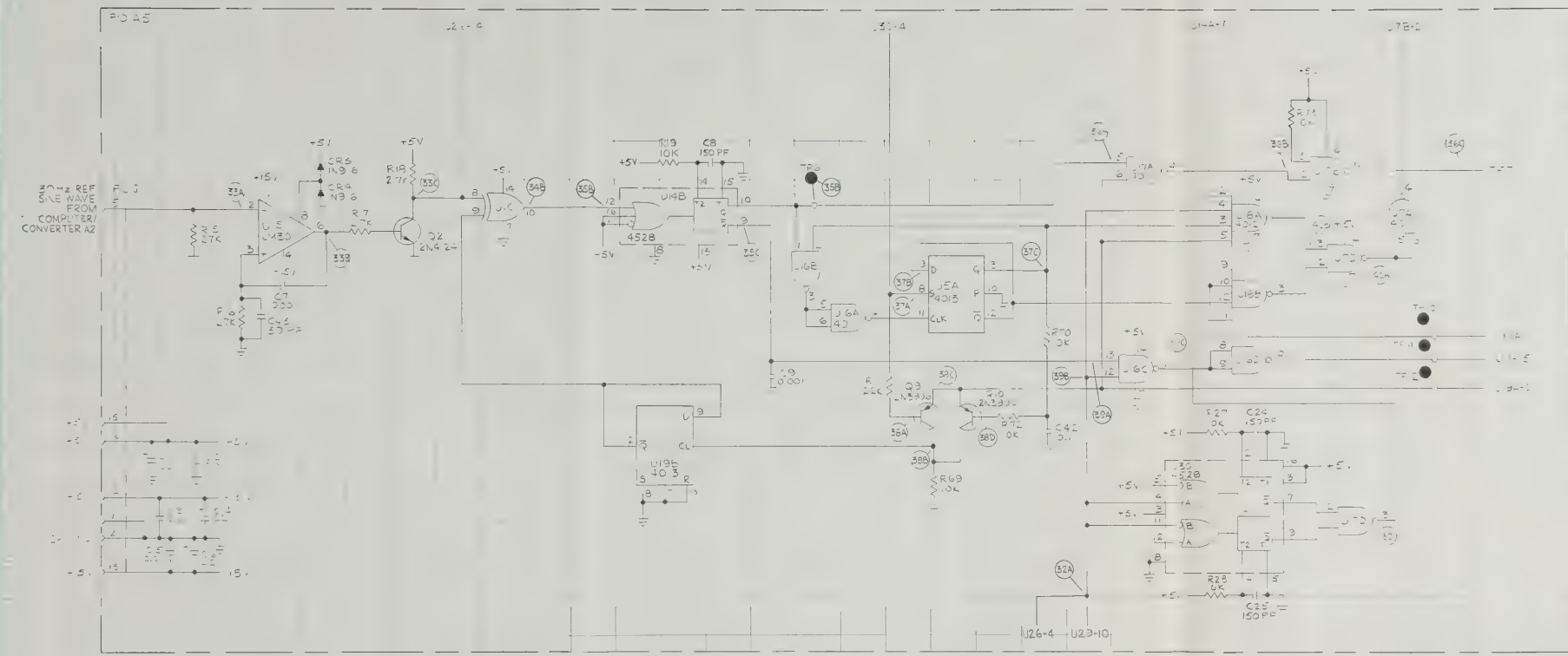
Figure 6-5. Schematic, Digital Processor (A5), (Sheet 1 of 4)



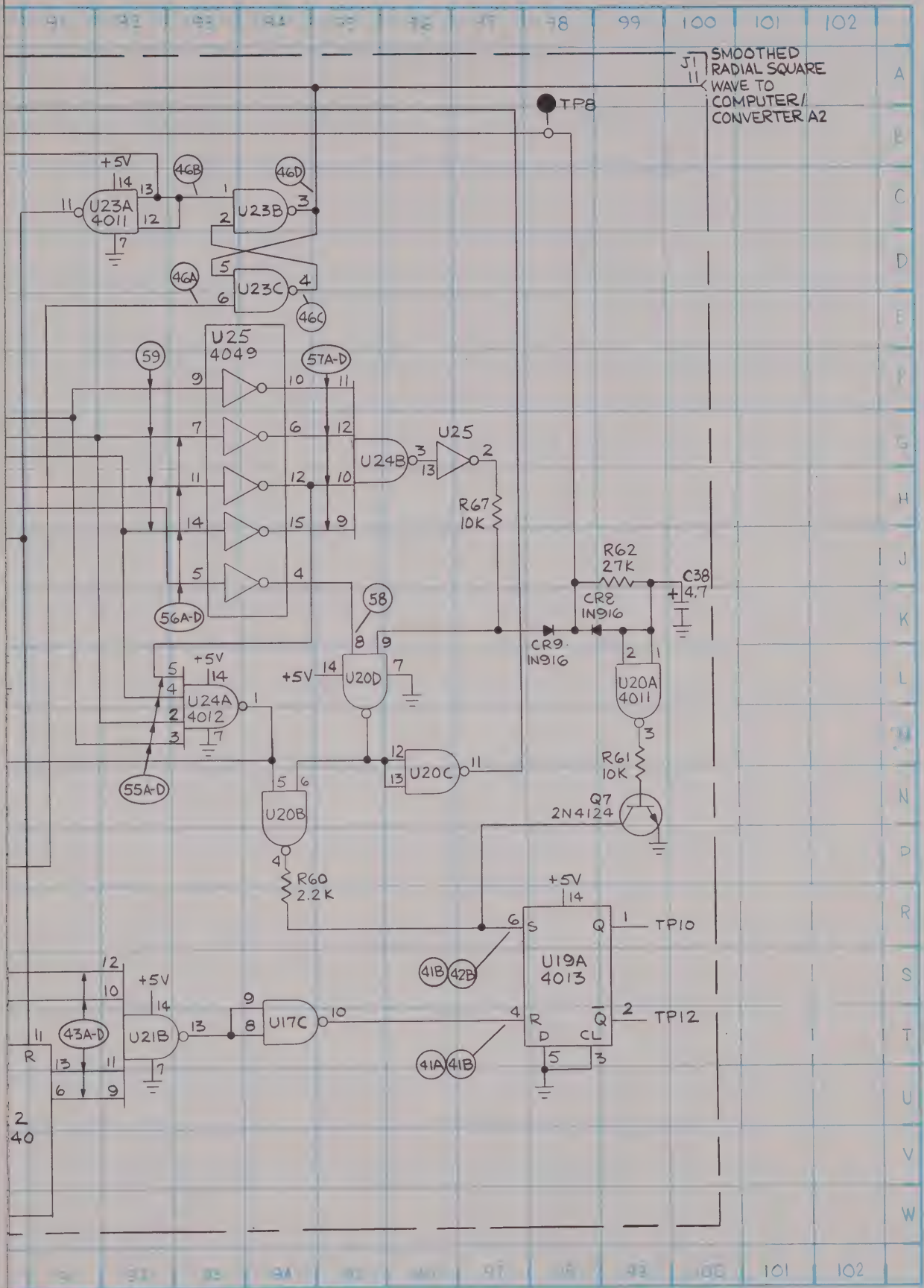
| PARTS LOCATION/CHANGE INDEX |      |         |       |      |         |       |      |         |       |      |         |       |      |         |
|-----------------------------|------|---------|-------|------|---------|-------|------|---------|-------|------|---------|-------|------|---------|
| DESIG                       | LOC  | CHG KEY | DESIG | LOC  | CHG KEY | DESIG | LOC  | CHG KEY | DESIG | LOC  | CHG KEY | DESIG | LOC  | CHG KEY |
| CR1                         | 62F  |         | C37   |      |         | R26   | 65R  |         | U4    | 69D  |         |       |      |         |
| CR2                         | 72E  |         | C38   | 100K |         | R27   | 27N  |         | U5    | 21J  |         | U37   | 128G |         |
| CR3                         | 7F   |         | C39   |      |         | R28   | 27T  |         |       | 22G  |         | U38   | 128K |         |
| CR4                         | 7G   |         | C40   | 63S  |         | R29   | 106R |         | U6    | 74C  |         | U39   | 128N |         |
| CR5                         | 106S |         | C41   | 63L  |         | R30   | 107R |         | U7    | 30H  |         | U40   | 128R |         |
| CR6                         | 145J |         | C42   | 23N  |         | R31   | 107S |         |       | 31G  |         | U41   | 133J |         |
| CR7                         |      |         | C43   | 6K   |         | R32   | 109S |         |       | 76G  |         |       | 133L |         |
| CR8                         | 99K  |         | L1    |      |         | R33   | 108T |         |       | 78F  |         |       | 135H |         |
| CR9                         | 98K  |         | L2    |      |         | R34   | 110T |         | U8    | 81D  |         | U42   | 142N |         |
| CR10                        |      |         | L3    |      |         | R35   | 112N |         | U9    | 84D  |         |       | 137N |         |
| CR11                        |      |         | L4    |      |         | R36   | 115H |         | U10   | 88D  |         |       | 137S |         |
| CR12                        |      |         | L5    |      |         | R37   | 116K |         | U11   | 80K  |         |       | 138R |         |
| CR13                        |      |         | L6    |      |         | R38   | 116K |         | U12   | 84K  |         | U43   | 133R |         |
| CR14                        |      |         | L7    |      |         | R39   | 118H |         | U13   | 88K  |         | U44   | 136G |         |
| CR15                        |      |         | L8    |      |         | R40   | 117M |         | U14   | 15G  |         |       | 138G |         |
| CR16                        |      |         | L9    |      |         | R41   | 118N |         |       | 57J  |         |       | 142G |         |
| CR17                        |      |         | L10   |      |         | R42   | 119M |         | U15   | 6H   |         | U45   | 142J |         |
| CR18                        |      |         | Q1    | 64D  |         | R43   | 120M |         | U16   | 18J  |         | U46   | 140K |         |
| CR19                        |      |         | Q2    | 9H   |         | R44   | 132H |         |       | 19K  |         |       | 142R |         |
| CR20                        |      |         | Q3    | 144J |         | R45   | 132L |         |       | 25L  |         | U47   | 147D |         |
| C1                          | 7F   |         | Q4    | 146J |         | R46   | 132M |         |       | 28L  |         | U48   | 62K  |         |
| C2                          | 69F  |         | Q5    |      |         | R47   | 132P |         | U17   | 25F  |         |       |      |         |
| C3                          | 74F  |         | Q6    | 67E  |         | R48   | 135R |         |       | 29F  |         |       |      |         |
| C4                          | 75E  |         | Q7    | 100N |         | R49   | 143J |         |       | 30R  |         |       |      |         |
| C5                          | 76D  |         | Q8    | 64G  |         | R50   | 144H |         |       | 95T  |         |       |      |         |
| C6                          | 58L  |         | Q9    | 20N  |         | R51   | 144K |         | U18   | 28G  |         |       |      |         |
| C7                          | 6J   |         | Q10   | 21N  |         | R52   | 145K |         |       | 28J  |         |       |      |         |
| C8                          | 16F  |         | Q11   |      |         | R53   | 146D |         | U19   | 15N  |         |       |      |         |
| C9                          | 17M  |         | Q12   |      |         | R54   | 146E |         |       | 99R  |         |       |      |         |
| C10                         | 91L  |         | Q13   |      |         | R55   | 147C |         | U20   | 95N  |         |       |      |         |
| C11                         | 3P   |         | Q14   |      |         | R56   | 62C  |         |       | 96L  |         |       |      |         |
| C12                         | 4P   |         | R1    | 63D  |         | R57   | 68C  |         |       | 97N  |         |       |      |         |
| C13                         | 3R   |         | R2    | 57E  |         | R58   | 67F  |         |       | 100L |         |       |      |         |
| C14                         | 4R   |         | R3    | 58G  |         | R59   |      |         | U21   | 88V  |         |       |      |         |
| C15                         | 4S   |         | R4    | 59G  |         | R60   | 95R  |         |       | 93T  |         |       |      |         |
| C16                         | 4S   |         | R5    | 62F  |         | R61   | 100N |         | U22   | 91U  |         |       |      |         |
| C17                         | 64M  |         | R6    | 63E  |         | R62   | 99J  |         | U23   | 94C  |         |       |      |         |
| C18                         | 62T  |         | R7    | 64B  |         | R63   | 61L  |         |       | 94C  |         |       |      |         |
| C19                         | 63T  |         | R8    | 69F  |         | R64   | 61L  |         |       | 94E  |         |       |      |         |
| C20                         | 64T  |         | R9    | 71D  |         | R65   | 63F  |         | U24   | 94M  |         |       |      |         |
| C21                         | 62U  |         | R10   | 74G  |         | R66   |      |         |       | 96G  |         |       |      |         |
| C22                         | 65R  |         | R11   | 75G  |         | R67   | 98H  |         | U25   | 94F  |         |       |      |         |
| C23                         | 72R  |         | R12   | 75C  |         | R68   | 60D  |         |       | 97G  |         |       |      |         |
| C24                         | 28N  |         | R13   | 76D  |         | R69   | 21R  |         | U26   | 61N  |         |       |      |         |
| C25                         | 28T  |         | R14   | 58L  |         | R70   | 23L  |         | U27   | 68P  |         |       |      |         |
| C26                         | 112P |         | R15   | 4H   |         | R71   | 20M  |         | U28   | 70P  |         |       |      |         |
| C27                         | 115J |         | R16   | 5K   |         | R72   | 22N  |         |       | 73P  |         |       |      |         |
| C28                         | 115L |         | R17   | 8H   |         | R73   | 29E  |         | U29   | 75P  |         |       |      |         |
| C29                         | 118J |         | R18   | 9F   |         | U1    | 11G  |         | U30   | 26P  |         |       |      |         |
| C30                         | 118M |         | R19   | 15F  |         |       | 56E  |         | U31   | 108F |         |       |      |         |
| C31                         | 131J |         | R20   | 62R  |         |       | 56J  |         | U32   | 108J |         |       |      |         |
| C32                         | 134M |         | R21   | 63S  |         | U2    | 61U  |         | U33   | 108M |         |       |      |         |
| C33                         | 134R |         | R22   | 64S  |         |       | 59F  |         | U34   | 110S |         |       |      |         |
| C34                         | 134P |         | R23   | 63V  |         | U3    | 67J  |         |       | 114K |         |       |      |         |
| C35                         | 62D  |         | R24   | 63V  |         |       | 70J  |         | U35   | 111F |         |       |      |         |
| C36                         | 67C  |         | R25   | 65T  |         |       | 70K  |         | U36   | 117L |         |       |      |         |

KEY A=ADDED  
C=CHANGE  
D=DELETED

L=LOCATION CHANGE  
V=VOLTAGE/WAVEFORM  
W=WIRE CHANGE







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Figure 6-5. Schematic, Digital Processor (A5)  
(Sheet 3 of 4)

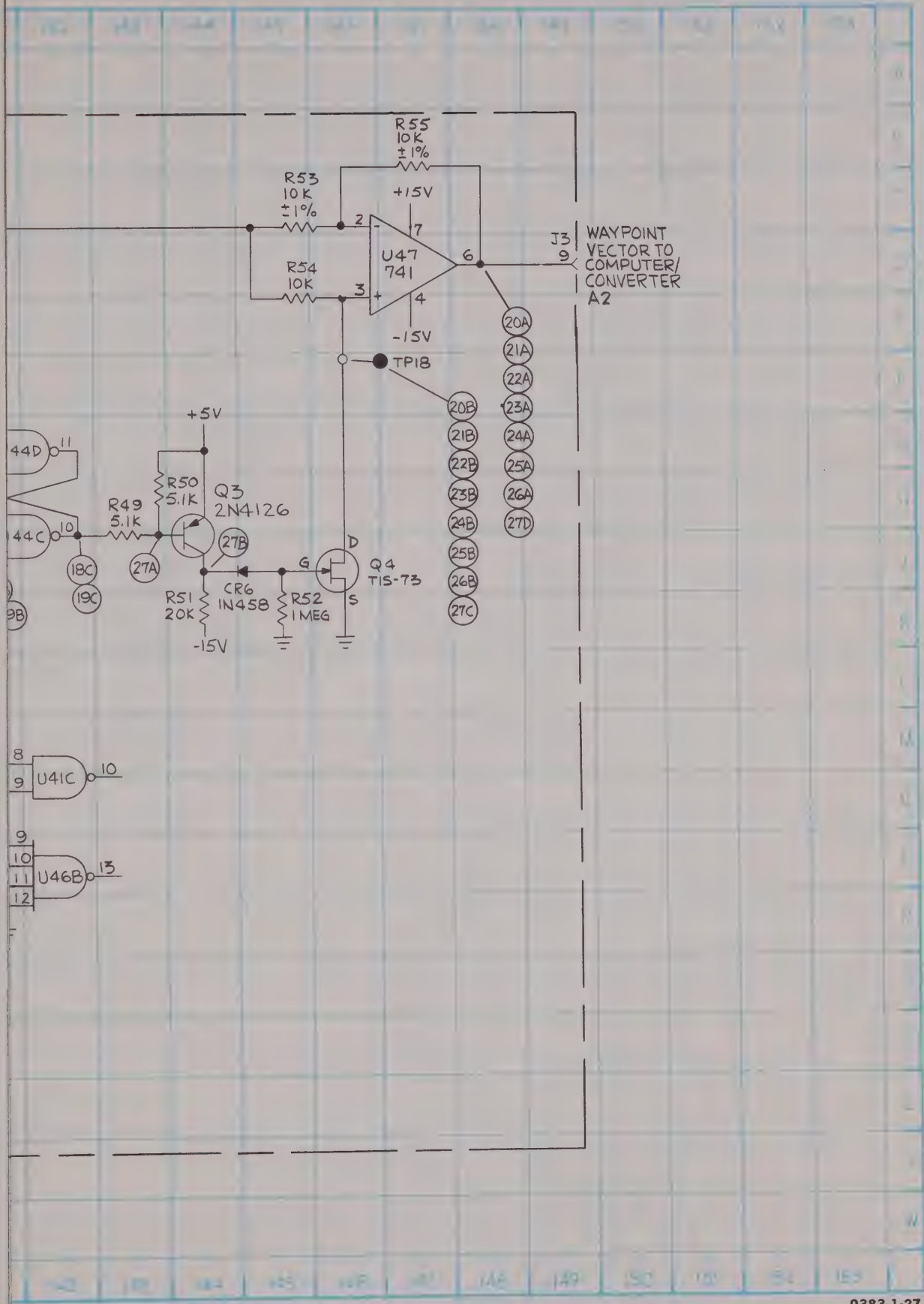






6-21/6-22





0383-1-27

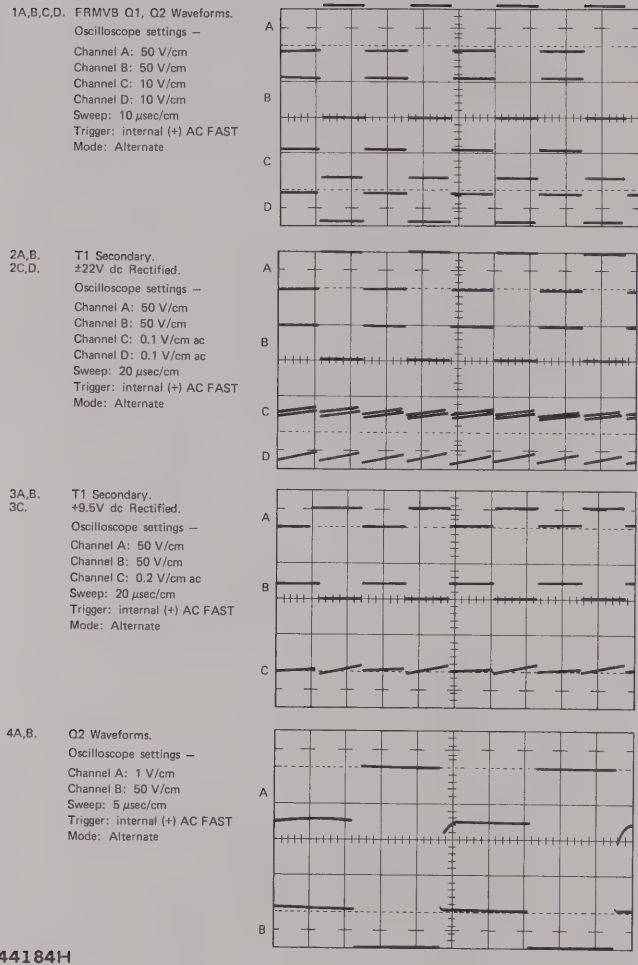
Figure 6-5. Schematic, Digital Processor (A5)  
(Sheet 4 of 4)





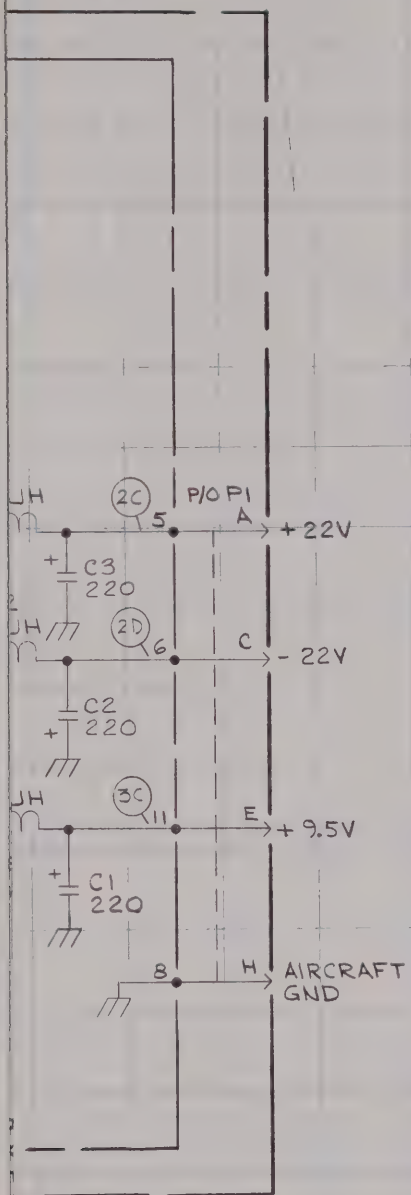






44184H

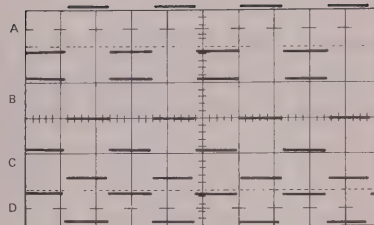
Figure 6-6. Schematic, Power Converter (A6), (Sheet 1 of 2)



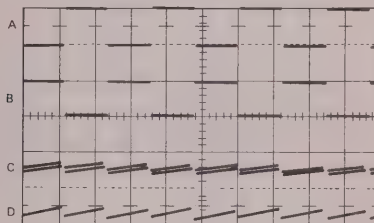
0383-1-28

Figure 6-6. Schematic, Power Converter (A6)  
(Sheet 2 of 2)

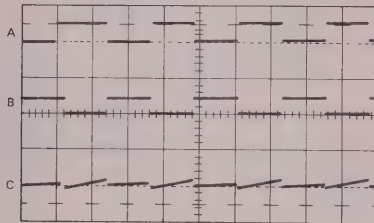
1A,B,C,D. FRMVB Q1, Q2 Waveforms.  
 Oscilloscope settings —  
 Channel A: 50 V/cm  
 Channel B: 50 V/cm  
 Channel C: 10 V/cm  
 Channel D: 10 V/cm  
 Sweep: 10  $\mu\text{sec}/\text{cm}$   
 Trigger: internal (+) AC FAST  
 Mode: Alternate



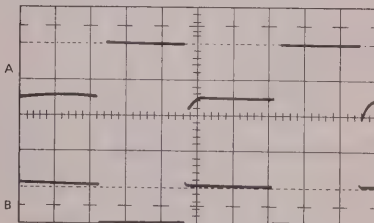
2A,B. T1 Secondary,  $\pm 22\text{V}$  dc Rectified.  
 2C,D. Oscilloscope settings —  
 Channel A: 50 V/cm  
 Channel B: 50 V/cm  
 Channel C: 0.1 V/cm ac  
 Channel D: 0.1 V/cm ac  
 Sweep: 20  $\mu\text{sec}/\text{cm}$   
 Trigger: internal (+) AC FAST  
 Mode: Alternate



3A,B. T1 Secondary, +9.5V dc Rectified.  
 3C. Oscilloscope settings —  
 Channel A: 50 V/cm  
 Channel B: 50 V/cm  
 Channel C: 0.2 V/cm ac  
 Sweep: 20  $\mu\text{sec}/\text{cm}$   
 Trigger: internal (+) AC FAST  
 Mode: Alternate



4A,B. Q2 Waveforms.  
 Oscilloscope settings —  
 Channel A: 1 V/cm  
 Channel B: 50 V/cm  
 Sweep: 5  $\mu\text{sec}/\text{cm}$   
 Trigger: internal (+) AC FAST  
 Mode: Alternate



44184H

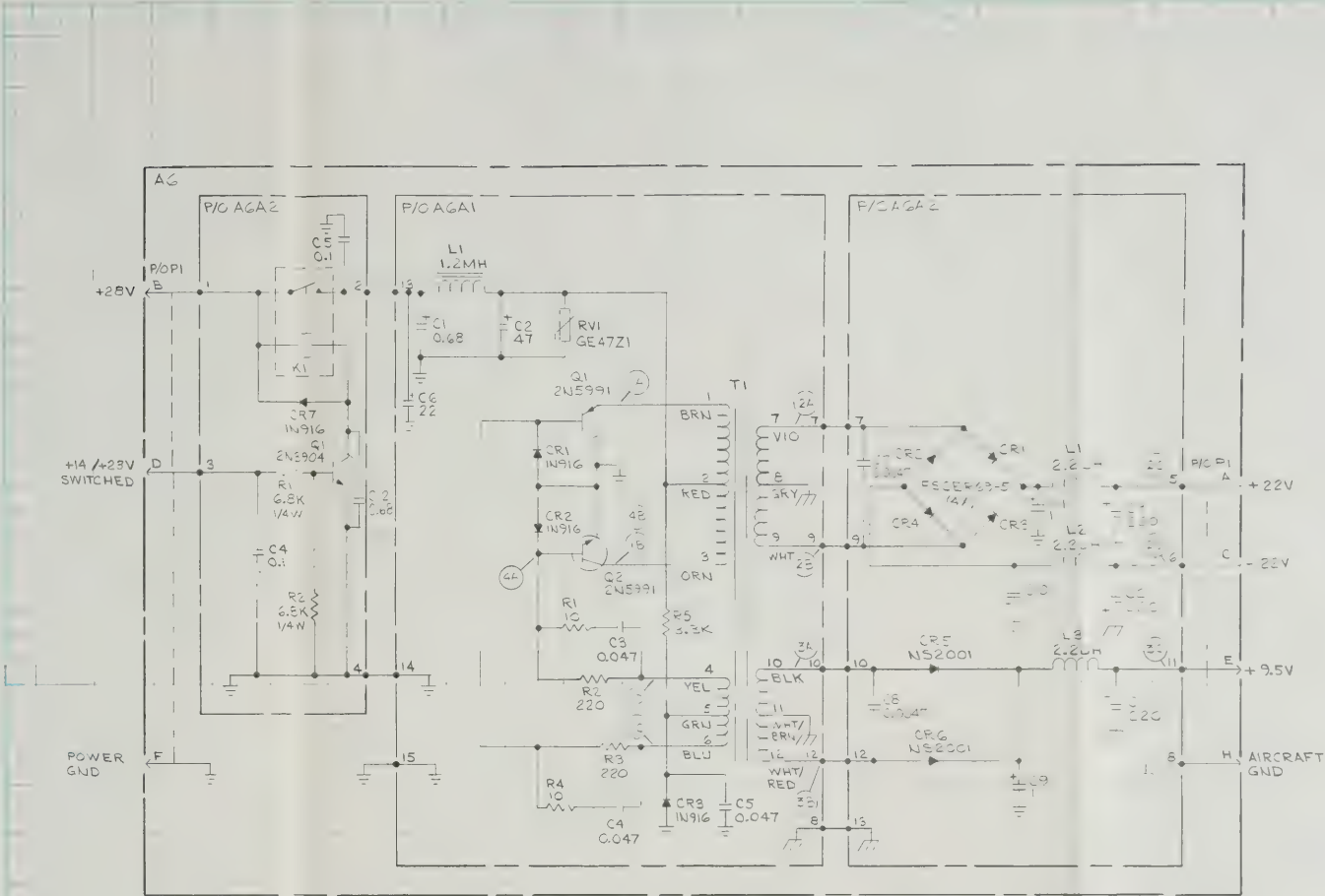
Figure 6-6. Schematic, Power Converter (A6), (Sheet 1 of 2)

| PARTS LOCATION/CHANGE INDEX |      |         |       |     |         |       |     |         |       |     |         |
|-----------------------------|------|---------|-------|-----|---------|-------|-----|---------|-------|-----|---------|
| DESIG                       | LOC  | CHG KEY | DESIG | LOC | CHG KEY | DESIG | LOC | CHG KEY | DESIG | LOC | CHG KEY |
| C1                          | A6A1 |         | CR6   | 16R |         |       |     |         |       |     |         |
| C2                          | 7F   |         | CR7   | 5H  |         |       |     |         |       |     |         |
| C3                          | 9F   |         | K1    | 5G  |         |       |     |         |       |     |         |
| C4                          | 10N  |         | L1    | 18J |         |       |     |         |       |     |         |
| C5                          | 10S  |         | L2    | 18L |         |       |     |         |       |     |         |
| L1                          | 12S  |         | L3    | 18M |         |       |     |         |       |     |         |
| Q1                          | 8E   |         | Q1    | 5J  |         |       |     |         |       |     |         |
| Q2                          | 10G  |         | R1    | 5K  |         |       |     |         |       |     |         |
| Q3                          | 10L  |         | R2    | 5M  |         |       |     |         |       |     |         |
| R1                          | 10M  |         | CR1   | 17J |         |       |     |         |       |     |         |
| R2                          | 10P  |         | CR2   | 16J |         |       |     |         |       |     |         |
| R3                          | 10R  |         | CR3   | 17K |         |       |     |         |       |     |         |
| R4                          | 9S   |         | CR4   | 16K |         |       |     |         |       |     |         |
| R5                          | 11M  |         | CR5   | 16N |         |       |     |         |       |     |         |
| RV1                         | 10F  |         | CR6   | 16R |         |       |     |         |       |     |         |
| T1                          | 12G  |         | CR7   | 5H  |         |       |     |         |       |     |         |
|                             | A6A2 |         | C1    | 19P |         |       |     |         |       |     |         |
| C1                          | 19P  |         | C2    | 19M |         |       |     |         |       |     |         |
| C2                          | 19M  |         | C3    | 19K |         |       |     |         |       |     |         |
| C3                          | 19K  |         | C4    | 4L  |         |       |     |         |       |     |         |
| C4                          | 5L   |         | C7    | 6E  |         |       |     |         |       |     |         |
| C5                          | 5E   |         | C8    |     |         |       |     |         |       |     |         |
| C7                          | 15J  |         | K1    | 5G  |         |       |     |         |       |     |         |
| C8                          | 15P  |         | L1    | 18J |         |       |     |         |       |     |         |
| C9                          | 17S  |         | L2    | 18L |         |       |     |         |       |     |         |
| C10                         | 17M  |         | L3    | 18N |         |       |     |         |       |     |         |
| C11                         | 17K  |         | Q1    | 6J  |         |       |     |         |       |     |         |
| C12                         | 6K   |         | R1    | 5J  |         |       |     |         |       |     |         |
| CR1                         | 17J  |         | R2    | 5M  |         |       |     |         |       |     |         |
| CR2                         | 15J  |         |       |     |         |       |     |         |       |     |         |
| CR3                         | 17K  |         |       |     |         |       |     |         |       |     |         |
| CR4                         | 15K  |         |       |     |         |       |     |         |       |     |         |
| CR5                         | 16M  |         |       |     |         |       |     |         |       |     |         |

CHG KEY: A=ADDED  
C=CHANGE  
D=DELETED

L=LOCATION CHANGE  
V-VOLTAGE/WAVEFORM  
W=WIRE CHANGE

- NOTES:
- Reference designations are abbreviated. For complete identification, prefix reference designation with assembly designation; for example, A1C1.
  - Capacitor values are in microfarads (μF) unless otherwise indicated.
  - Resistor values are in ohms unless otherwise indicated.







## SECTION 7

### ILLUSTRATED PARTS LIST

#### 7-1. INTRODUCTION.

The Illustrated Parts List tabulates, illustrates and describes assemblies, subassemblies and detailed parts for the RN-478A Area Navigation Computer and mounting assembly. Parts lists for the IN44 ( ) ( ), IN41 ( ), and A-119A are not included, since these units are not field repairable. For parts list of other units and accessories available for an RN-478A installation, refer to table 1-2.

#### 7-2. GENERAL.

The Illustrated Parts List consists of a breakdown of the complete unit into subassemblies and detailed parts. Each assembly is listed in its order of disassembly and is followed by its component parts properly indented below it to show their relationship to the assembly. The attaching parts are listed immediately following the assembly or parts they attach. Items which are made from raw stock such as cut lengths of wire are not included in the Illustrated Parts List.

#### 7-3. FIGURE AND INDEX NUMBER COLUMN.

In this column, the digits preceding the second dash refer to the figure on which a part or assembly is illustrated. The digits following the second dash are the index number of the parts and assemblies.

#### 7-4. PART NUMBER COLUMN.

This column lists the ARC part number. The part number consists of a "basic" number and a "dash" number. The latter indicating variations in the basic number.

#### 7-5. DESCRIPTIVE COLUMN.

This column lists each assembly, its attaching parts and components of the assembly properly indented to show their relationship to the assembly. The symbol - - - \* - - - is used to denote the end of attaching parts and the continuation of the listing. The indentation of attaching parts is the same as for the parts they attach.

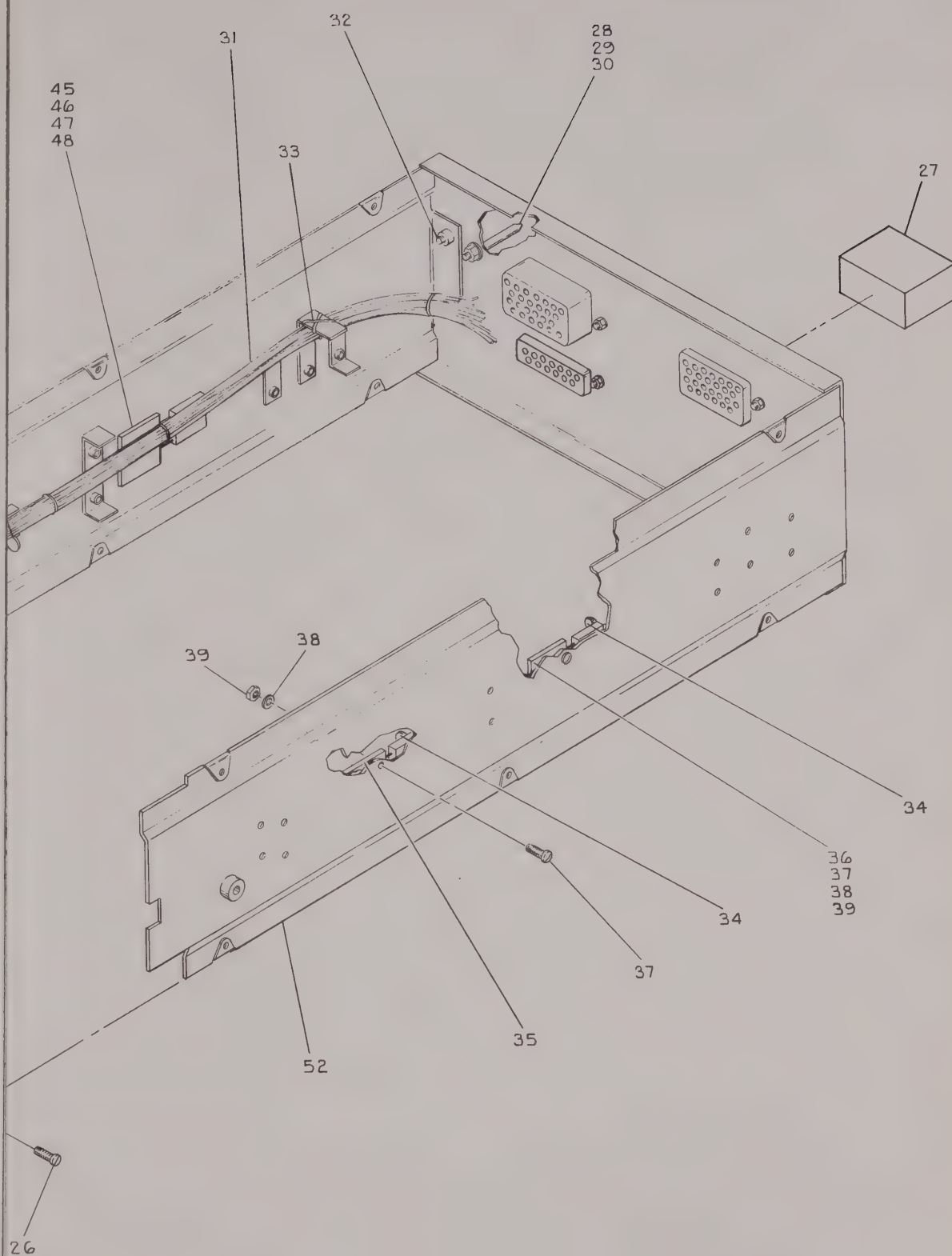
#### 7-6. UNITS PER ASSEMBLY COLUMN.

This column lists the quantities of assemblies or parts required in the immediately preceding assembly of which the given part or assembly is a component. The quantities specified, therefore, are not necessarily the total used per equipment. Nonprocurable parts or assemblies are indicated by the abbreviation "NP". The letters "AR" denote that the selection of a part or parts should be made "as required". "REF" refers to an assembly which is shown completely assembled on a preceding illustration and is now exploded on the illustration on which it is referenced. In this case the description has a notation which refers to the illustration on which the assembly is shown completely assembled and indexed.

#### 7-7. USABLE ON CODE COLUMN.

Part variations within the groups of equipment are indicated by a letter symbol in this column. In cases where the usable on code column has been left blank, parts listed apply to all equipment covered by this Illustrated Parts List.

| Figure &<br>Index No. | Part<br>Number | Description                                                                              |   |   |   |   |   | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|------------------------------------------------------------------------------------------|---|---|---|---|---|----------------------|----------------------|
|                       |                | 1                                                                                        | 2 | 3 | 4 | 5 | 6 |                      |                      |
| 7-1-                  | 44100-0000     | AREA NAV COMPUTER, RN-478A . . . . .                                                     |   |   |   |   |   | 1                    | A                    |
|                       | 44100-1000     | AREA NAV COMPUTER, RN-478A . . . . .                                                     |   |   |   |   |   | 1                    | B                    |
|                       | 44100-1100     | AREA NAV COMPUTER, RN-478A . . . . .                                                     |   |   |   |   |   | 1                    | C                    |
| -1                    | 44102-0000     | . NAMEPLATE . . . . .                                                                    |   |   |   |   |   | 1                    | A                    |
|                       | 44102-1000     | . NAMEPLATE . . . . .                                                                    |   |   |   |   |   | 1                    | B                    |
|                       | 44102-1100     | . NAMEPLATE . . . . .                                                                    |   |   |   |   |   | 1                    | C                    |
| -2                    | 45629-0002     | . DECAL, Equipment match . . . . .                                                       |   |   |   |   |   | 1                    |                      |
| -3                    | 44363-0000     | . PLATE, Modification . . . . .                                                          |   |   |   |   |   | 1                    |                      |
| -4                    | 42028-0001     | . PLUG, Bottom . . . . .                                                                 |   |   |   |   |   | 1                    | A                    |
|                       | 42028-0000     | . PLUG, Bottom . . . . .                                                                 |   |   |   |   |   | 1                    | B, C                 |
| -5                    | 44115-0000     | . COVER, Top . . . . .<br>(ATTACHING PARTS)                                              |   |   |   |   |   | 1                    |                      |
| -6                    | 35595-4012     | . SCREW, Bdgh, sst, 4-40 by 3/16 in lg . . . . .<br>- - - * - - -                        |   |   |   |   |   | 6                    |                      |
| -7                    | 44119-0478     | . COVER, Bottom . . . . .<br>(ATTACHING PARTS)                                           |   |   |   |   |   | 1                    |                      |
| -8                    | 35595-4012     | . SCREW, Bdgh, sst, 4-40 by 3/16 in lg . . . . .<br>- - - * - - -                        |   |   |   |   |   | 6                    |                      |
| -9                    | 44130-0000     | . COMPUTER/CONVERTER ASSEMBLY, A2 (See figure 7-2 for details)<br>(ATTACHING PARTS)      |   |   |   |   |   | 1                    |                      |
| -10                   | 35595-4016     | . SCREW, Bdgh, sst, 4-40 by 1/4 in lg . . . . .<br>- - - * - - -                         |   |   |   |   |   | 6                    |                      |
| -11                   | 45532-0000     | . INSULATOR . . . . .                                                                    |   |   |   |   |   | 1                    |                      |
| -12                   | 44120-0000     | . LOCALIZER, DVM, Dimmer assembly A3 (See figure 7-3 for details) .<br>(ATTACHING PARTS) |   |   |   |   |   | 1                    |                      |
| -13                   | 532-0012       | . SCREW, Bdgh w/lk wash, sst, 2-56 by 3/16 in lg . . . . .                               |   |   |   |   |   | 4                    |                      |
| -14                   | 35595-4016     | . SCREW, Bdgh, sst, 4-40 by 1/4 in lg . . . . .                                          |   |   |   |   |   | 4                    |                      |
| -15                   | 28665-0031     | . RING, Retaining . . . . .<br>- - - * - - -                                             |   |   |   |   |   | 2                    |                      |
| -16                   | 43297-0000     | . INSULATOR . . . . .                                                                    |   |   |   |   |   | 1                    |                      |
| -17                   | 44170-0000     | . DIGITAL PROCESSOR ASSEMBLY, A5 (See figure 7-4 for details) .<br>(ATTACHING PARTS)     |   |   |   |   |   | 1                    |                      |
| -18                   | 35595-4016     | . SCREW, Bdgh, sst, 4-40 by 1/4 in lg . . . . .                                          |   |   |   |   |   | 5                    |                      |
| -19                   | 14680-0000     | . WASHER, Formed . . . . .<br>- - - * - - -                                              |   |   |   |   |   | 5                    |                      |
| -20                   | 44140-0000     | . DISPLAY ASSEMBLY, A4 (See figure 7-5 for details) . . . . .<br>(ATTACHING PARTS)       |   |   |   |   |   | 1                    |                      |
| -21                   | 532-0012       | . SCREW, Bdgh w/lk wash, sst, 2-56 by 3/16 in lg . . . . .                               |   |   |   |   |   | 2                    |                      |
| -22                   | 35595-4016     | . SCREW, Bdgh, sst, 4-40 by 1/4 in lg . . . . .<br>- - - * - - -                         |   |   |   |   |   | 6                    |                      |
| -23                   | 44183-0000     | . POWER CONVERTER ASSEMBLY, A6 (See figure 7-6 for details) .<br>(ATTACHING PARTS)       |   |   |   |   |   | 1                    |                      |
| -24                   | 534-0016       | . SCREW, Bdgh w/lk wash, sst, 4-40 by 1/4 in lg . . . . .<br>- - - * - - -               |   |   |   |   |   | 4                    |                      |
| -25                   | 44134-0000     | . PANEL AND SWITCH ASSEMBLY, A1 (See figure 7-9 for details) .                           |   |   |   |   |   | 1                    | A, B                 |
|                       | 44134-0000     | . PANEL AND SWITCH ASSEMBLY, A1 (See figure 7-9 for details) .<br>(ATTACHING PARTS)      |   |   |   |   |   | 1                    | C                    |
| -26                   | 154-0032       | . SCREW, Flh, brs blk oxd, 2-56 by 1/2 in lg . . . . .                                   |   |   |   |   |   | 4                    | A, B                 |
|                       | 144-0032       | . SCREW, Flh, brs np, 2-56 by 1/2 in lg . . . . .<br>- - - * - - -                       |   |   |   |   |   | 2                    |                      |
| -27                   | 37766-0926     | . CAP, Plastic . . . . .                                                                 |   |   |   |   |   | 2                    |                      |
| -28                   | 44165-0000     | . PIN, Location . . . . .<br>(ATTACHING PARTS)                                           |   |   |   |   |   | 2                    |                      |
| -29                   | 365-4016       | . NUT, Hex, sst, 4-40 . . . . .                                                          |   |   |   |   |   | 2                    |                      |
| -30                   | 8497-0000      | . WASHER, Lock, sst, No. 4 . . . . .<br>- - - * - - -                                    |   |   |   |   |   | 2                    |                      |



0383-1-12

*Figure 7-1. Area Navigation Computer, RN-476A, Exploded View*



| Figure &<br>Index No. | Part<br>Number | Description                                                                            | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|----------------------------------------------------------------------------------------|----------------------|----------------------|
|                       |                | 1 2 3 4 5 6                                                                            |                      |                      |
| 7-1-                  | 44100-0000     | AREA NAV COMPUTER, RN-478A                                                             | 1                    | A                    |
|                       | 44100-1000     | AREA NAV COMPUTER, RN-478A                                                             | 1                    | B                    |
|                       | 44100-1100     | AREA NAV COMPUTER, RN-478A                                                             | 1                    | C                    |
| -1                    | 44102-0000     | . NAMEPLATE                                                                            | 1                    | A                    |
|                       | 44102-1000     | . NAMEPLATE                                                                            | 1                    | B                    |
|                       | 44102-1100     | . NAMEPLATE                                                                            | 1                    | C                    |
| -2                    | 45629-0002     | . DECAL, Equipment match                                                               | 1                    |                      |
| -3                    | 44363-0000     | . PLATE, Modification                                                                  | 1                    |                      |
| -4                    | 42028-0001     | . PLUG, Bottom                                                                         | 1                    | A                    |
|                       | 42028-0000     | . PLUG, Bottom                                                                         | 1                    | B, C                 |
| -5                    | 44115-0000     | . COVER, Top<br>(ATTACHING PARTS)                                                      | 1                    |                      |
| -6                    | 35595-4012     | . SCREW, Bdgh, sst, 4-40 by 3/16 in lg<br>- * - - -                                    | 6                    |                      |
| -7                    | 44119-0478     | . COVER, Bottom<br>(ATTACHING PARTS)                                                   | 1                    |                      |
| -8                    | 35595-4012     | . SCREW, Bdgh, sst, 4-40 by 3/16 in lg<br>- * - - -                                    | 6                    |                      |
| -9                    | 44130-0000     | . COMPUTER/CONVERTER ASSEMBLY, A2 (See figure 7-2 for details)<br>(ATTACHING PARTS)    | 1                    |                      |
| -10                   | 35595-4016     | . SCREW, Bdgh, sst, 4-40 by 1/4 in lg<br>- * - - -                                     | 6                    |                      |
| -11                   | 45532-0000     | . INSULATOR                                                                            | 1                    |                      |
| -12                   | 44120-0000     | . LOCALIZER, DVM, Dimmer assembly A3 (See figure 7-3 for details)<br>(ATTACHING PARTS) | 1                    |                      |
| -13                   | 532-0012       | . SCREW, Bdgh w/lk wash, sst, 2-56 by 3/16 in lg                                       | 4                    |                      |
| -14                   | 35595-4016     | . SCREW, Bdgh, sst, 4-40 by 1/4 in lg                                                  | 4                    |                      |
| -15                   | 28665-0031     | . RING, Retaining<br>- * - - -                                                         | 2                    |                      |
| -16                   | 43297-0000     | . INSULATOR                                                                            | 1                    |                      |
| -17                   | 44170-0000     | . DIGITAL PROCESSOR ASSEMBLY, A5 (See figure 7-4 for details)<br>(ATTACHING PARTS)     | 1                    |                      |
| -18                   | 35595-4016     | . SCREW, Bdgh, sst, 4-40 by 1/4 in lg                                                  | 5                    |                      |
| -19                   | 14680-0000     | . WASHER, Formed<br>- * - - -                                                          | 5                    |                      |
| -20                   | 44140-0000     | . DISPLAY ASSEMBLY, A4 (See figure 7-5 for details)<br>(ATTACHING PARTS)               | 1                    |                      |
| -21                   | 532-0012       | . SCREW, Bdgh w/lk wash, sst, 2-56 by 3/16 in lg                                       | 2                    |                      |
| -22                   | 35595-4016     | . SCREW, Bdgh, sst, 4-40 by 1/4 in lg<br>- * - - -                                     | 6                    |                      |
| -23                   | 44183-0000     | . POWER CONVERTER ASSEMBLY, A6 (See figure 7-6 for details)<br>(ATTACHING PARTS)       | 1                    |                      |
| -24                   | 534-0016       | . SCREW, Bdgh w/lk wash, sst, 4-40 by 1/4 in lg<br>- * - - -                           | 4                    |                      |
| -25                   | 44134-0000     | . PANEL AND SWITCH ASSEMBLY, A1 (See figure 7-9 for details)                           | 1                    | A, B                 |
|                       | 44134-0000     | . PANEL AND SWITCH ASSEMBLY, A1 (See figure 7-9 for details)<br>(ATTACHING PARTS)      | 1                    | C                    |
| -26                   | 154-0032       | . SCREW, Flh, brs blk oxd, 2-56 by 1/2 in lg                                           | 4                    | A, B                 |
|                       | 144-0032       | . SCREW, Flh, brs np, 2-56 by 1/2 in lg<br>- * - - -                                   | 2                    |                      |
| -27                   | 37766-0926     | . CAP, Plastic                                                                         | 2                    |                      |
| -28                   | 44165-0000     | . PIN, Location<br>(ATTACHING PARTS)                                                   | 2                    |                      |
| -29                   | 365-4016       | . NUT, Hex, sst, 4-40                                                                  | 2                    |                      |
| -30                   | 8497-0000      | . WASHER, Lock, sst, No. 4<br>- * - - -                                                | 2                    |                      |



7-3/7-4



| Figure &<br>Index No. | Part<br>Number | Description                                                         | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|---------------------------------------------------------------------|----------------------|----------------------|
|                       |                | 1 2 3 4 5 6                                                         |                      |                      |
| 7-2-                  | 44130-0000     | COMPUTER/CONVERTER ASSEMBLY, A2 (See Fig 7-1 -9 for NHA) . .        | REF                  |                      |
| CR1                   | 32433-0005     | . SEMICONDUCTOR DEVICE, Diode Type IN916 . . . . .                  | 1                    |                      |
| CR2                   | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR3                   | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR4                   | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR5                   | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR6                   | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR7                   | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR8                   | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR9                   | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR10                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR11                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR12                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR13                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR14                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR15                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR16                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR17                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR18                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR19                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR20                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR21                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR22                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR23                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR24                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR25                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR26                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR27                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR28                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR29                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR30                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR31                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR32                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR33                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR34                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR35                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR36                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR37                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR38                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| CR39                  | 32433-0005     | . Same as CR1 . . . . .                                             | 1                    |                      |
| C1                    | 40248-2220     | . CAPACITOR, Fxd, mtlc, 47 $\mu$ F $\pm$ 20%, 20 Vdc . . . . .      | 1                    |                      |
| C2                    | 40248-2220     | . Same as C1 . . . . .                                              | 1                    |                      |
| C3                    | 41915-0103     | . CAPACITOR, Fxd, cer, 0.01 $\mu$ F $\pm$ 20%, 18 Vdc . . . . .     | 1                    |                      |
| C4                    | 32423-9223     | . CAPACITOR, Fxd, plstc, 0.022 $\mu$ F $\pm$ 10%, 80 Vdc . . . . .  | 1                    |                      |
| C5                    | 32423-9223     | . Same as C4 . . . . .                                              | 1                    |                      |
| C6                    | 30949-0392     | . CAPACITOR, Fxd, cer, 3,900 pF $\pm$ 10%, 200 Vdc . . . . .        | 1                    |                      |
| C7                    | 40248-2051     | . CAPACITOR, Fxd, mtlc, 0.10 $\mu$ F $\pm$ 20%, 35 Vdc . . . . .    | 1                    |                      |
| C8                    | 32423-9222     | . CAPACITOR, Fxd, plstc, 0.22 $\pm$ 10%, 80 Vdc . . . . .           | 1                    |                      |
| C9                    | 40248-2074     | . CAPACITOR, Fxd, mtlc, 1 $\mu$ F $\pm$ 20%, 35 Vdc . . . . .       | 1                    |                      |
| C10                   | 30949-0102     | . CAPACITOR, Fxd, cer, 1,000 pF $\pm$ 10%, 200 Vdc . . . . .        | 1                    |                      |
| C11                   | 32423-9473     | . CAPACITOR, Fxd, plstc, 0.047 $\mu$ F $\pm$ 10%, 80 Vdc . . . . .  | 1                    |                      |
| C12                   | 32423-9334     | . CAPACITOR, Fxd, plstc, 0.0033 $\mu$ F $\pm$ 10%, 80 Vdc . . . . . | 1                    |                      |
| C13                   | 40248-2203     | . CAPACITOR, Fxd, mtlc, 2.2 $\mu$ F $\pm$ 20%, 20 Vdc . . . . .     | 1                    |                      |
| C14                   | 40649-1473     | . CAPACITOR, Fxd, mtlc, 0.047 $\mu$ F $\pm$ 10%, 50 Vdc . . . . .   | 1                    |                      |
| C15                   | 32423-9473     | . Same as C11 . . . . .                                             | 1                    |                      |
| C16                   | 32423-9223     | . Same as C4 . . . . .                                              | 1                    |                      |

| Figure &<br>Index No. | Part<br>Number | Description                                              | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|----------------------------------------------------------|----------------------|----------------------|
|                       |                | 1 2 3 4 5 6                                              |                      |                      |
| 7-2-C17               | 40248-2074     | . Same as C9                                             | 1                    |                      |
| C18                   | 30949-0102     | . Same as C10                                            | 1                    |                      |
| C19                   | 40248-2078     | . CAPACITOR, Fxd, mtlc, 2.2 $\mu$ F $\pm$ 20%, 35 Vdc    | 1                    |                      |
| C20                   | 30949-0331     | . CAPACITOR, Fxd, cer, 330 pF $\pm$ 10%, 200 Vdc         | 1                    |                      |
| C21                   | 40248-2059     | . CAPACITOR, Fxd, mtlc, 0.47 $\mu$ F $\pm$ 20%, 35 Vdc   | 1                    |                      |
| C22                   | 32423-9222     | . Same as C8                                             | 1                    |                      |
| C23                   | 32423-9223     | . Same as C4                                             | 1                    |                      |
| C24                   | 32423-9153     | . CAPACITOR, Fxd, plstc, 0.015 $\mu$ F $\pm$ 10%, 80 Vdc | 1                    |                      |
| C25                   | 32423-9222     | . Same as C8                                             | 1                    |                      |
| C27                   | 42536-1472     | . CAPACITOR, Fxd, plstc, 0.47 $\mu$ F $\pm$ 10%, 100 Vdc | 1                    |                      |
| C28                   | 40248-2074     | . Same as C9                                             | 1                    |                      |
| C29                   | 30949-0102     | . Same as C10                                            | 1                    |                      |
| C30                   | 40248-2366     | . CAPACITOR, Fxd, mtlc, 4.7 $\mu$ F $\pm$ 20%, 35 Vdc    | 1                    |                      |
| C31                   | 40248-2220     | . Same as C1                                             | 1                    |                      |
| C32                   | 40248-2122     | . CAPACITOR, Fxd, mtlc, 100 $\mu$ F $\pm$ 20%, 10 Vdc    | 1                    |                      |
| C33                   | 40248-2126     | . CAPACITOR, Fxd, mtlc, 220 $\mu$ F $\pm$ 20%, 10 Vdc    | 1                    |                      |
| C34                   | 29293-9102     | . CAPACITOR, Fxd, cer, 0.10 $\mu$ F +80 -20%, 12 Vdc     | 1                    |                      |
| C35                   | 29293-9102     | . Same as C34                                            | 1                    |                      |
| C36                   | 29293-9102     | . Same as C34                                            | 1                    |                      |
| C37                   | 40248-2166     | . CAPACITOR, Fxd, mtlc, 22 $\mu$ F $\pm$ 20%, 15 Vdc     | 1                    |                      |
| C38                   | 40649-1104     | . CAPACITOR, Fxd, mtlc, 0.10 $\mu$ F $\pm$ 10%, 50 Vdc   | 1                    |                      |
| C39                   | 40248-2074     | . Same as C9                                             | 1                    |                      |
| C40                   | 40248-2074     | . Same as C9                                             | 1                    |                      |
| C41                   | 40649-1473     | . Same as C14                                            | 1                    |                      |
| C42                   | 40649-1473     | . Same as C14                                            | 1                    |                      |
| C43                   | 40649-1153     | . CAPACITOR, Fxd, mtlc, 0.015 $\mu$ F $\pm$ 10%, 50 Vdc  | 1                    |                      |
| C44                   | 40649-1473     | . Same as C14                                            | 1                    |                      |
| C45                   | 40649-1473     | . Same as C14                                            | 1                    |                      |
| C46                   | 40248-2211     | . CAPACITOR, Fxd, mtlc, 10 $\mu$ F $\pm$ 20%, 20 Vdc     | 1                    |                      |
| C47                   | 40248-2211     | . Same as C46                                            | 1                    |                      |
| C48                   | 40248-2211     | . Same as C46                                            | 1                    |                      |
| C49                   | 40248-2211     | . Same as C46                                            | 1                    |                      |
| C50                   | 42536-1682     | . CAPACITOR, Fxd, plstc, 0.68 $\mu$ F $\pm$ 10%, 100 Vdc | 1                    |                      |
| C52                   | 40248-2106     | . CAPACITOR, Fxd, mtlc, 4.7 $\mu$ F $\pm$ 20%, 10 Vdc    | 1                    |                      |
| C53                   | 40248-2375     | . CAPACITOR, Fxd, mtlc, 22 $\mu$ F $\pm$ 20%, 35 Vdc     | 1                    |                      |
| C54                   | 40248-2375     | . Same as C53                                            | 1                    |                      |
| C55                   | 32423-9102     | . CAPACITOR, Fxd, plstc, 0.10 $\mu$ F $\pm$ 10%, 80 Vdc  | 1                    |                      |
| C56                   | 28448-0470     | . CAPACITOR, Fxd, cer, 47 pF $\pm$ 10%, 200 Vdc          | 1                    |                      |
| C57                   | 40248-2078     | . Same as C19                                            | 1                    |                      |
| C58                   | 30949-0102     | . Same as C10                                            | 1                    |                      |
| C59                   | 40248-2059     | . Same as C21                                            | 1                    |                      |
| C60                   | 40248-2375     | . Same as C53                                            | 1                    |                      |
| C61                   | 40248-2074     | . Same as C9                                             | 1                    |                      |
| C62                   | 41915-0103     | . Same as C3                                             | 1                    |                      |
| C63                   | 40248-2211     | . Same as C46                                            | 1                    |                      |
| C64                   | 40248-2211     | . Same as C46                                            | 1                    |                      |
| C65                   | 40248-2375     | . Same as C53                                            | 1                    |                      |
| C66                   | 31476-9103     | . CAPACITOR, Fxd, cer, 0.01 $\mu$ F +80 -20%, 25 Vdc     | 1                    |                      |
| C67                   | 40248-2375     | . Same as C53                                            | 1                    |                      |
| C68                   | 31476-9103     | . Same as C66                                            | 1                    |                      |
| C69                   | 31476-9103     | . Same as C66                                            | 1                    |                      |
| C70                   | 40248-2375     | . Same as C53                                            | 1                    |                      |
| C72                   | 42536-1472     | . Same as C27                                            | 1                    |                      |
| C73                   | 40248-2375     | . Same as C53                                            | 1                    |                      |
| C74                   | 40248-2375     | . Same as C53                                            | 1                    |                      |



| Figure &<br>Index No. | Part<br>Number | Description |                                                     |   |   |   |   | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|-------------|-----------------------------------------------------|---|---|---|---|----------------------|----------------------|
|                       |                | 1           | 2                                                   | 3 | 4 | 5 | 6 |                      |                      |
| 7-2-C75               | 40248-2375     | .           | Same as C53                                         | . | . | . | . | 1                    |                      |
| C76                   | 40248-2375     | .           | Same as C53                                         | . | . | . | . | 1                    |                      |
| C77                   | 40248-1203     | .           | CAPACITOR, Fxd, mtlc, 2.2 $\mu$ F $\pm$ 10%, 20 Vdc | . | . | . | . | 1                    |                      |
| C78                   | 40248-2126     | .           | Same as C33                                         | . | . | . | . | 1                    |                      |
| C79                   | 31456-9503     | .           | CAPACITOR, Fxd, cer, 0.05 +80 -20%, 25 Vdc          | . | . | . | . | 1                    |                      |
| C80                   | 41915-0103     | .           | Same as C3                                          | . | . | . | . | 1                    |                      |
| C81                   | 28448-0390     | .           | CAPACITOR, Fxd, cer, 39 pF $\pm$ 10%, 200 Vdc       | . | . | . | . | 1                    |                      |
| C82                   | 28448-0471     | .           | CAPACITOR, Fxd, cer, 470 pF $\pm$ 10%, 200 Vdc      | . | . | . | . | 1                    |                      |
| J1                    | 42461-1016     | .           | SOCKET                                              | . | . | . | . | 1                    |                      |
| J2                    | 42461-1016     | .           | Same as J1                                          | . | . | . | . | 1                    |                      |
| J3                    | 42461-1016     | .           | Same as J1                                          | . | . | . | . | 1                    |                      |
| L1                    | 36336-0103     | .           | COIL, RF, 10 mH                                     | . | . | . | . | 1                    |                      |
| L2                    | 34894-8221     | .           | COIL, RF, 2.2 mH                                    | . | . | . | . | 1                    |                      |
| Q1                    | 36916-4124     | .           | TRANSISTOR, Type 2N4124                             | . | . | . | . | 1                    |                      |
| Q2                    | 36916-4124     | .           | Same as Q1                                          | . | . | . | . | 1                    |                      |
| Q3                    | 36916-4124     | .           | Same as Q1                                          | . | . | . | . | 1                    |                      |
| Q4                    | 37556-3906     | .           | TRANSISTOR, Type 2N3906                             | . | . | . | . | 1                    |                      |
| Q5                    | 41123-0061     | .           | TRANSISTOR, Type 2N3904                             | . | . | . | . | 1                    |                      |
| Q6                    | 41123-0057     | .           | TRANSISTOR, Type TIS73                              | . | . | . | . | 1                    |                      |
| Q7                    | 41123-0057     | .           | Same as Q6                                          | . | . | . | . | 1                    |                      |
| Q8                    | 36961-4124     | .           | Same as Q1                                          | . | . | . | . | 1                    |                      |
| Q9                    | 36961-4124     | .           | Same as Q1                                          | . | . | . | . | 1                    |                      |
| Q10                   | 36961-4124     | .           | Same as Q1                                          | . | . | . | . | 1                    |                      |
| Q11                   | 36961-4124     | .           | Same as Q1                                          | . | . | . | . | 1                    |                      |
| Q12                   | 41123-0057     | .           | Same as Q6                                          | . | . | . | . | 1                    |                      |
| Q13                   | 41123-0001     | .           | TRANSISTOR, Type 2N3821                             | . | . | . | . | 1                    |                      |
| Q14                   | 41123-0057     | .           | Same as Q6                                          | . | . | . | . | 1                    |                      |
| Q15                   | 41123-0057     | .           | Same as Q6                                          | . | . | . | . | 1                    |                      |
| Q16                   | 36962-4126     | .           | TRANSISTOR, Type 2N4126                             | . | . | . | . | 1                    |                      |
| Q17                   | 41123-0057     | .           | Same as Q6                                          | . | . | . | . | 1                    |                      |
| Q18                   | 36961-4124     | .           | Same as Q1                                          | . | . | . | . | 1                    |                      |
| Q19                   | 41123-0057     | .           | Same as Q6                                          | . | . | . | . | 1                    |                      |
| Q20                   | 36962-4126     | .           | Same as Q16                                         | . | . | . | . | 1                    |                      |
| Q21                   | 41123-0057     | .           | Same as Q6                                          | . | . | . | . | 1                    |                      |
| Q22                   | 41123-0061     | .           | Same as Q5                                          | . | . | . | . | 1                    |                      |
| Q23                   | 41123-0057     | .           | Same as Q6                                          | . | . | . | . | 1                    |                      |
| Q24                   | 36962-4126     | .           | Same as Q16                                         | . | . | . | . | 1                    |                      |
| Q25                   | 36961-4124     | .           | Same as Q1                                          | . | . | . | . | 1                    |                      |
| Q26                   | 41123-0057     | .           | Same as Q6                                          | . | . | . | . | 1                    |                      |
| Q27                   | 36962-4126     | .           | Same as Q16                                         | . | . | . | . | 1                    |                      |
| Q28                   | 41123-0057     | .           | Same as Q6                                          | . | . | . | . | 1                    |                      |
| Q29                   | 36961-4124     | .           | Same as Q1                                          | . | . | . | . | 1                    |                      |
| Q30                   | 36961-4124     | .           | Same as Q1                                          | . | . | . | . | 1                    |                      |
| R1                    | 341-0242       | .           | RESISTOR, Fxd, cmpsn, 2.4 k ohms $\pm$ 5%, 1/4 W    | . | . | . | . | 1                    |                      |
| R2                    | 341-0104       | .           | RESISTOR, Fxd, cmpsn, 100 k ohms $\pm$ 5%, 1/4 W    | . | . | . | . | 1                    |                      |
| R3                    | 341-0752       | .           | RESISTOR, Fxd, cmpsn, 7.5 k ohms $\pm$ 5%, 1/4 W    | . | . | . | . | 1                    |                      |
| R4                    | 341-0103       | .           | RESISTOR, Fxd, cmpsn, 10 k ohms $\pm$ 5%, 1/4 W     | . | . | . | . | 1                    |                      |
| R5                    | 341-0134       | .           | RESISTOR, Fxd, cmpsn, 130 k ohms $\pm$ 5%, 1/4 W    | . | . | . | . | 1                    |                      |
| R6                    | 341-0624       | .           | RESISTOR, Fxd, cmpsn, 620 k ohms $\pm$ 5%, 1/4 W    | . | . | . | . | 1                    |                      |
| R7                    | 341-0222       | .           | RESISTOR, Fxd, cmpsn, 2.2 k ohms $\pm$ 5%, 1/4 W    | . | . | . | . | 1                    |                      |
| R8                    | 341-0623       | .           | RESISTOR, Fxd, cmpsn, 62 k ohms $\pm$ 5%, 1/4 W     | . | . | . | . | 1                    |                      |
| R9                    | 341-0682       | .           | RESISTOR, Fxd, cmpsn, 6.8 k ohms $\pm$ 5%, 1/4 W    | . | . | . | . | 1                    |                      |
| R10                   | 341-0102       | .           | RESISTOR, Fxd, cmpsn, 1 k ohms $\pm$ 5%, 1/4 W      | . | . | . | . | 1                    |                      |
| R11                   | 341-0222       | .           | Same as R7                                          | . | . | . | . | 1                    |                      |
| R12                   | 341-0472       | .           | RESISTOR, Fxd, cmpsn, 4.7 k ohms $\pm$ 5%, 1/4 W    | . | . | . | . | 1                    |                      |

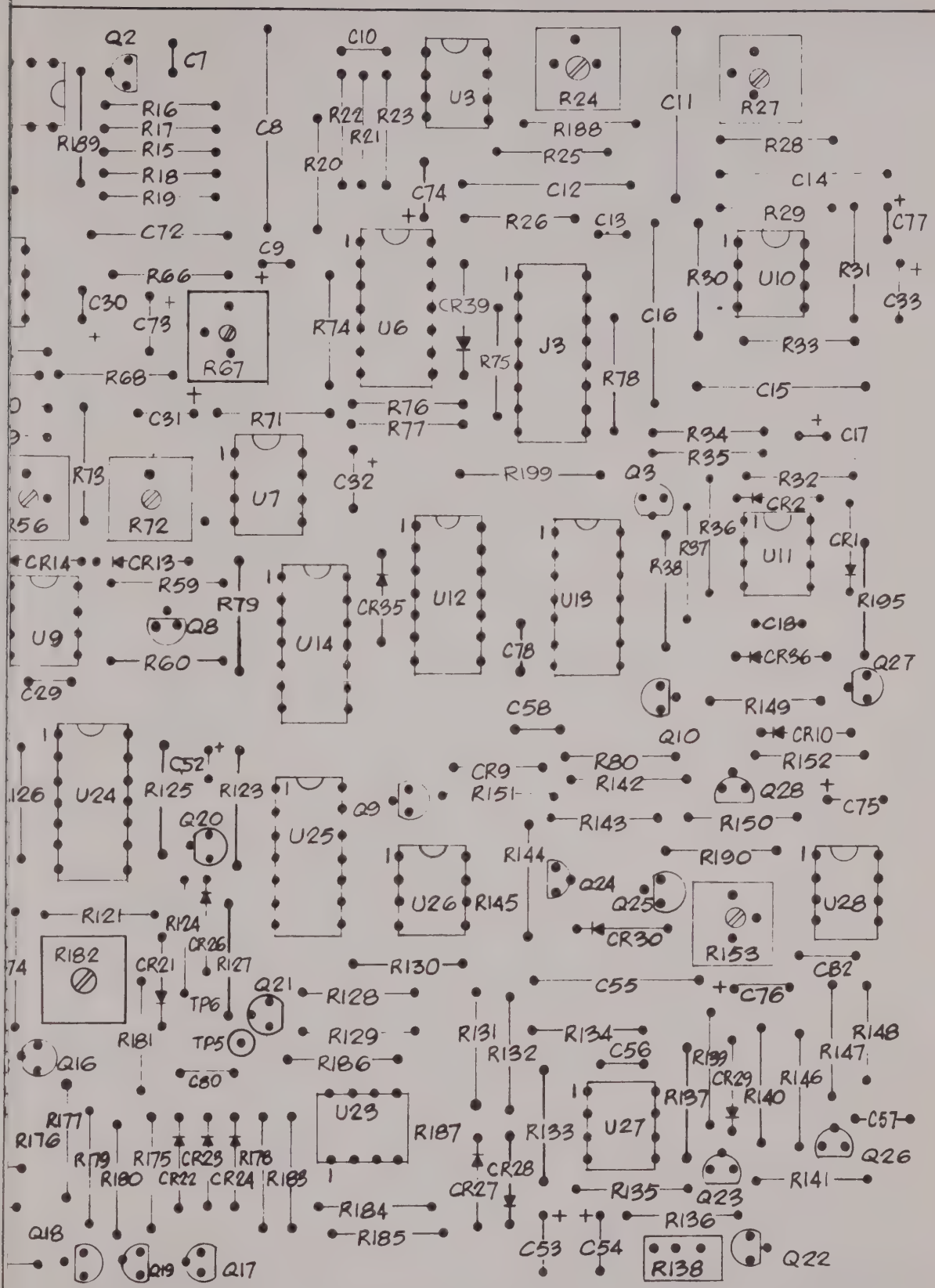


| Figure &<br>Index No. | Part<br>Number | Description<br>1 2 3 4 5 6                                       | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|------------------------------------------------------------------|----------------------|----------------------|
| 7-2-R13               | 341-0153       | . RESISTOR, Fxd, cmpsn, 15 k ohms $\pm 5\%$ , 1/4 W . . . . .    | 1                    |                      |
| R14                   | 341-0154       | . RESISTOR, Fxd, cmpsn, 150 k ohms $\pm 5\%$ , 1/4 W . . . . .   | 1                    |                      |
| R15                   | 341-0510       | . RESISTOR, Fxd, cmpsn, 51 ohms $\pm 5\%$ , 1/4 W . . . . .      | 1                    |                      |
| R16                   | 341-0911       | . RESISTOR, Fxd, cmpsn, 910 ohms $\pm 5\%$ , 1/4 W . . . . .     | 1                    |                      |
| R17                   | 341-0330       | . RESISTOR, Fxd, cmpsn, 33 ohms $\pm 5\%$ , 1/4 W . . . . .      | 1                    |                      |
| R18                   | 341-0222       | . Same as R7 . . . . .                                           | 1                    |                      |
| R19                   | 39319-2004     | . RESISTOR, Fxd, film, 20 k ohms $\pm 1\%$ , 1/4 W . . . . .     | 1                    |                      |
| R20                   | 341-0273       | . RESISTOR, Fxd, cmpsn, 27 k ohms $\pm 5\%$ , 1/4 W . . . . .    | 1                    |                      |
| R21                   | 341-0564       | . RESISTOR, Fxd, cmpsn, 560 k ohms $\pm 5\%$ , 1/4 W . . . . .   | 1                    |                      |
| R22                   | 341-0564       | . Same as R21 . . . . .                                          | 1                    |                      |
| R23                   | 39319-2003     | . RESISTOR, Fxd, film, 2 k ohms $\pm 1\%$ , 1/4 W . . . . .      | 1                    |                      |
| R24                   | 44473-0503     | . RESISTOR, Var, 50 k ohms $\pm 10\%$ , 1/2 W . . . . .          | 1                    |                      |
| R25                   | 341-0104       | . Same as R2 . . . . .                                           | 1                    |                      |
| R26                   | 39319-3575     | . RESISTOR, Fxd, film, 357 k ohms $\pm 1\%$ , 1/4 W . . . . .    | 1                    |                      |
| R27                   | 44473-0203     | . RESISTOR, Var, 20 k ohms $\pm 10\%$ , 1/2 W . . . . .          | 1                    |                      |
| R28                   | 39319-1025     | . RESISTOR, Fxd, film, 102 k ohms $\pm 1\%$ , 1/4 W . . . . .    | 1                    |                      |
| R29                   | 341-0105       | . RESISTOR, Fxd, cmpsn, 1 meg ohms $\pm 5\%$ , 1/4 W . . . . .   | 1                    |                      |
| R30                   | 341-0123       | . RESISTOR, Fxd, cmpsn, 12 k ohms $\pm 5\%$ , 1/4 W . . . . .    | 1                    |                      |
| R31                   | 341-0104       | . Same as R2 . . . . .                                           | 1                    |                      |
| R32                   | 341-0104       | . Same as R2 . . . . .                                           | 1                    |                      |
| R33                   | 341-0115       | . RESISTOR, Fxd, cmpsn, 1.1 meg ohms $\pm 5\%$ , 1/4 W . . . . . | 1                    |                      |
| R34                   | 341-0243       | . RESISTOR, Fxd, cmpsn, 24 k ohms $\pm 5\%$ , 1/4 W . . . . .    | 1                    |                      |
| R35                   | 341-0273       | . Same as R20 . . . . .                                          | 1                    |                      |
| R36                   | 341-0273       | . Same as R20 . . . . .                                          | 1                    |                      |
| R37                   | 341-0272       | . RESISTOR, Fxd, cmpsn, 2.7 k ohms $\pm 5\%$ , 1/4 W . . . . .   | 1                    |                      |
| R38                   | 341-0272       | . Same as R37 . . . . .                                          | 1                    |                      |
| R39                   | 341-0512       | . RESISTOR, Fxd, cmpsn, 5.1 k ohms $\pm 5\%$ , 1/4 W . . . . .   | 1                    |                      |
| R40                   | 341-0512       | . Same as R39 . . . . .                                          | 1                    |                      |
| R41                   | 341-0203       | . RESISTOR, Fxd, cmpsn, 20 k ohms $\pm 5\%$ , 1/4 W . . . . .    | 1                    |                      |
| R42                   | 341-0203       | . Same as R41 . . . . .                                          | 1                    |                      |
| R43                   | 341-0203       | . Same as R41 . . . . .                                          | 1                    |                      |
| R44                   | 341-0105       | . Same as R29 . . . . .                                          | 1                    |                      |
| R45                   | 341-0105       | . Same as R29 . . . . .                                          | 1                    |                      |
| R46                   | 44473-0102     | . RESISTOR, Var, 1 k ohms $\pm 10\%$ , 1/2 W . . . . .           | 1                    |                      |
| R47                   | 341-0474       | . RESISTOR, Fxd, cmpsn, 470 k ohms $\pm 5\%$ , 1/4 W . . . . .   | 1                    |                      |
| R48                   | 341-0203       | . Same as R41 . . . . .                                          | 1                    |                      |
| R49                   | 341-0222       | . Same as R7 . . . . .                                           | 1                    |                      |
| R50                   | 341-0473       | . RESISTOR, Fxd, cmpsn, 47 k ohms $\pm 5\%$ , 1/4 W . . . . .    | 1                    |                      |
| R51                   | 341-0473       | . Same as R51 . . . . .                                          | 1                    |                      |
| R52                   | 39319-2005     | . RESISTOR, Fxd, film, 200 k ohms $\pm 1\%$ , 1/4 W . . . . .    | 1                    |                      |
| R53                   | 341-0683       | . RESISTOR, Fxd, cmpsn, 68 k ohms $\pm 5\%$ , 1/4 W . . . . .    | 1                    |                      |
| R54                   | 341-0222       | . Same as R7 . . . . .                                           | 1                    |                      |
| R56                   | 44473-0203     | . Same as R27 . . . . .                                          | 1                    |                      |
| R57                   | 341-0273       | . Same as R20 . . . . .                                          | 1                    |                      |
| R58                   | 341-0273       | . Same as R20 . . . . .                                          | 1                    |                      |
| R59                   | 341-0272       | . Same as R37 . . . . .                                          | 1                    |                      |
| R60                   | 341-0272       | . Same as R37 . . . . .                                          | 1                    |                      |
| R61                   | 341-0203       | . Same as R41 . . . . .                                          | 1                    |                      |
| R62                   | 341-0203       | . Same as R41 . . . . .                                          | 1                    |                      |
| R63                   | 341-0223       | . RESISTOR, Fxd, cmpsn, 22 k ohms $\pm 5\%$ , 1/4 W . . . . .    | 1                    |                      |
| R64                   | 341-0203       | . Same as R41 . . . . .                                          | 1                    |                      |
| R65                   | 341-0116       | . RESISTOR, Fxd, cmpsn, 11 meg ohms $\pm 5\%$ , 1/4 W . . . . .  | 1                    |                      |
| R66                   | 341-0123       | . Same as R30 . . . . .                                          | 1                    |                      |
| R67                   | 44473-0202     | . RESISTOR, Fxd, cmpsn, 2 k ohms $\pm 5\%$ , 1/4 W . . . . .     | 1                    |                      |
| R68                   | 341-0222       | . Same as R7 . . . . .                                           | 1                    |                      |

| Figure &<br>Index No. | Part<br>Number | Description |                                                    |   |   |   |   | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|-------------|----------------------------------------------------|---|---|---|---|----------------------|----------------------|
|                       |                | 1           | 2                                                  | 3 | 4 | 5 | 6 |                      |                      |
| 7-2-R69               | 341-0223       | .           | Same as R63                                        | . | . | . | . | 1                    |                      |
| R70                   | 341-0223       | .           | Same as R63                                        | . | . | . | . | 1                    |                      |
| R71                   | 341-0116       | .           | Same as R65                                        | . | . | . | . | 1                    |                      |
| R72                   | 44473-0202     | .           | Same as R67                                        | . | . | . | . | 1                    |                      |
| R73                   | 341-0622       | .           | RESISTOR, Fxd, cmpsn, 6.2 k ohms $\pm 5\%$ , 1/4 W | . | . | . | . | 1                    |                      |
| R74                   | 341-0222       | .           | Same as R7                                         | . | . | . | . | 1                    |                      |
| R75                   | 341-0222       | .           | Same as R7                                         | . | . | . | . | 1                    |                      |
| R76                   | 341-0103       | .           | Same as R4                                         | . | . | . | . | 1                    |                      |
| R77                   | 341-0102       | .           | Same as R10                                        | . | . | . | . | 1                    |                      |
| R78                   | 341-0203       | .           | Same as R41                                        | . | . | . | . | 1                    |                      |
| R79                   | 341-0432       | .           | RESISTOR, Fxd, cmpsn, 4.3 k ohms $\pm 5\%$ , 1/4 W | . | . | . | . | 1                    |                      |
| R80                   | 341-0472       | .           | Same as R12                                        | . | . | . | . | 1                    |                      |
| R81                   | 39319-1004     | .           | RESISTOR, Fxd, film, 10 k ohms $\pm 5\%$ , 1/4 W   | . | . | . | . | 1                    |                      |
| R82                   | 39319-1004     | .           | Same as R81                                        | . | . | . | . | 1                    |                      |
| R83                   | 39319-1004     | .           | Same as R81                                        | . | . | . | . | 1                    |                      |
| R84                   | 39319-1004     | .           | Same as R81                                        | . | . | . | . | 1                    |                      |
| R85                   | 44310-0203     | .           | RESISTOR, Var, 20 k ohms $\pm 10\%$ , 1/2 W        | . | . | . | . | 1                    |                      |
| R86                   | 341-0102       | .           | Same as R10                                        | . | . | . | . | 1                    |                      |
| R87                   | 341-0121       | .           | RESISTOR, Fxd, cmpsn, 120 ohms $\pm 5\%$ , 1/4 W   | . | . | . | . | 1                    |                      |
| R88                   | 341-0103       | .           | Same as R4                                         | . | . | . | . | 1                    |                      |
| R89                   | 39319-1504     | .           | RESISTOR, Fxd, film, 15 k ohms $\pm 1\%$ , 1/4 W   | . | . | . | . | 1                    |                      |
| R90                   | 39319-5114     | .           | RESISTOR, Fxd, film, 51.1 k ohms $\pm 1\%$ , 1/4 W | . | . | . | . | 1                    |                      |
| R91                   | 44473-0203     | .           | Same as R27                                        | . | . | . | . | 1                    |                      |
| R92                   | 39319-1004     | .           | Same as R84                                        | . | . | . | . | 1                    |                      |
| R93                   | 39319-1004     | .           | Same as R84                                        | . | . | . | . | 1                    |                      |
| R94                   | 341-0103       | .           | Same as R4                                         | . | . | . | . | 1                    |                      |
| R95                   | 341-0105       | .           | Same as R29                                        | . | . | . | . | 1                    |                      |
| R96                   | 341-0512       | .           | Same as R39                                        | . | . | . | . | 1                    |                      |
| R97                   | 341-0512       | .           | Same as R39                                        | . | . | . | . | 1                    |                      |
| R98                   | 341-0512       | .           | Same as R39                                        | . | . | . | . | 1                    |                      |
| R99                   | 341-0203       | .           | Same as R41                                        | . | . | . | . | 1                    |                      |
| R100                  | 39319-1005     | .           | RESISTOR, Fxd, film, 100 k ohms $\pm 1\%$ , 1/4 W  | . | . | . | . | 1                    |                      |
| R101                  | 39319-1005     | .           | Same as R100                                       | . | . | . | . | 1                    |                      |
| R102                  | 39319-2435     | .           | RESISTOR, Fxd, film, 243 k ohms $\pm 1\%$ , 1/4 W  | . | . | . | . | 1                    |                      |
| R103                  | 39319-1006     | .           | RESISTOR, Fxd, film, 1 meg ohms $\pm 1\%$ , 1/4 W  | . | . | . | . | 1                    |                      |
| R104                  | 39319-9094     | .           | RESISTOR, Fxd, film, 90.9 k ohms $\pm 1\%$ , 1/4 W | . | . | . | . | 1                    |                      |
| R106                  | 39319-1825     | .           | RESISTOR, Fxd, film, 182 k ohms $\pm 1\%$ , 1/4 W  | . | . | . | . | 1                    |                      |
| R107                  | 39319-1825     | .           | Same as R106                                       | . | . | . | . | 1                    |                      |
| R108                  | 39319-3925     | .           | RESISTOR, Fxd, film, 392 k ohms $\pm 1\%$ , 1/4 W  | . | . | . | . | 1                    |                      |
| R109                  | 39319-1504     | .           | Same as R89                                        | . | . | . | . | 1                    |                      |
| R110                  | 341-0184       | .           | RESISTOR, Fxd, cmpsn, 180 k ohms $\pm 5\%$ , 1/4 W | . | . | . | . | 1                    |                      |
| R111                  | 341-0103       | .           | Same as R4                                         | . | . | . | . | 1                    |                      |
| R112                  | 39319-3924     | .           | RESISTOR, Fxd, film, 39.2 k ohms $\pm 1\%$ , 1/4 W | . | . | . | . | 1                    |                      |
| R113                  | 39319-1304     | .           | RESISTOR, Fxd, film, 13 k ohms $\pm 1\%$ , 1/4 W   | . | . | . | . | 1                    |                      |
| R114                  | 341-0105       | .           | Same as R29                                        | . | . | . | . | 1                    |                      |
| R115                  | 341-0103       | .           | Same as R4                                         | . | . | . | . | 1                    |                      |
| R116                  | 39319-2003     | .           | Same as R23                                        | . | . | . | . | 1                    |                      |
| R117                  | 44473-0502     | .           | RESISTOR, Var, 5 k ohms $\pm 10\%$ , 1/2 W         | . | . | . | . | 1                    |                      |
| R118                  | 341-0472       | .           | Same as R12                                        | . | . | . | . | 1                    |                      |
| R119                  | 341-0472       | .           | Same as R12                                        | . | . | . | . | 1                    |                      |
| R120                  | 341-0472       | .           | Same as R12                                        | . | . | . | . | 1                    |                      |
| R121                  | 341-0103       | .           | Same as R4                                         | . | . | . | . | 1                    |                      |
| R122                  | 341-0103       | .           | Same as R4                                         | . | . | . | . | 1                    |                      |
| R123                  | 341-0513       | .           | RESISTOR, Fxd, cmpsn, 51 k ohms $\pm 5\%$ , 1/4 W  | . | . | . | . | 1                    |                      |
| R124                  | 341-0512       | .           | Same as R39                                        | . | . | . | . | 1                    |                      |

| Figure &<br>Index No. | Part<br>Number | Description                                            | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|--------------------------------------------------------|----------------------|----------------------|
|                       |                | 1 2 3 4 5 6                                            |                      |                      |
| 7-2-R125              | 341-0512       | . Same as R39                                          | 1                    |                      |
| R126                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R127                  | 341-0105       | . Same as R29                                          | 1                    |                      |
| R128                  | 43294-1004     | . RESISTOR, Fxd, film, 10 k ohms $\pm 0.1\%$ , 1/4 W   | 1                    |                      |
| R129                  | 341-0103       | . Same as R4                                           | 1                    |                      |
| R130                  | 43294-1004     | . Same as R128                                         | 1                    |                      |
| R131                  | 341-0393       | . RESISTOR, Fxd, cmpsn, 39 k ohms $\pm 5\%$ , 1/4 W    | 1                    |                      |
| R132                  | 341-0393       | . Same as R131                                         | 1                    |                      |
| R133                  | 341-0393       | . Same as R131                                         | 1                    |                      |
| R134                  | 39319-1335     | . RESISTOR, Fxd, film, 133 k ohms $\pm 1\%$ , 1/4 W    | 1                    |                      |
| R135                  | 341-0623       | . Same as R8                                           | 1                    |                      |
| R136                  | 341-0106       | . RESISTOR, Fxd, cmpsn, 10 meg ohms $\pm 5\%$ , 1/4 W  | 1                    |                      |
| R137                  | 341-0225       | . RESISTOR, Fxd, cmpsn, 2.2 meg ohms $\pm 5\%$ , 1/4 W | 1                    |                      |
| R138                  | 44310-0503     | . RESISTOR, Fxd, cmpsn, 50 k ohms $\pm 5\%$ , 1/4 W    | 1                    |                      |
| R139                  | 341-0105       | . Same as R29                                          | 1                    |                      |
| R140                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R141                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R142                  | 341-0512       | . Same as R39                                          | 1                    |                      |
| R143                  | 341-0512       | . Same as R39                                          | 1                    |                      |
| R144                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R145                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R146                  | 341-0105       | . Same as R29                                          | 1                    |                      |
| R147                  | 341-0103       | . Same as R4                                           | 1                    |                      |
| R148                  | 341-9271       | . RESISTOR, Fxd, cmpsn, 2.7 ohms $\pm 5\%$ , 1/4 W     | 1                    |                      |
| R149                  | 341-0512       | . Same as R39                                          | 1                    |                      |
| R150                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R151                  | 341-0222       | . Same as R7                                           | 1                    |                      |
| R152                  | 341-0105       | . Same as R29                                          | 1                    |                      |
| R153                  | 44473-0103     | . RESISTOR, Var, 10 k ohms $\pm 10\%$ , 1/2 W          | 1                    |                      |
| R154                  | 39319-2004     | . Same as R19                                          | 1                    |                      |
| R155                  | 39319-2004     | . Same as R19                                          | 1                    |                      |
| R156                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R157                  | 341-0103       | . Same as R4                                           | 1                    |                      |
| R158                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R159                  | 341-0393       | . Same as R131                                         | 1                    |                      |
| R160                  | 44310-0103     | . RESISTOR, Var, 10 k ohms $\pm 10\%$ , 1/2 W          | 1                    |                      |
| R161                  | 44310-0103     | . Same as R160                                         | 1                    |                      |
| R162                  | 341-0105       | . Same as R29                                          | 1                    |                      |
| R163                  | 39319-3924     | . Same as R112                                         | 1                    |                      |
| R164                  | 39319-3324     | . RESISTOR, Fxd, film, 33.2 k ohms $\pm 1\%$ , 1/4 W   | 1                    |                      |
| R165                  | 44310-0103     | . Same as R160                                         | 1                    |                      |
| R166                  | 341-0105       | . Same as R29                                          | 1                    |                      |
| R167                  | 39319-9094     | . Same as R104                                         | 1                    |                      |
| R168                  | 44310-0503     | . Same as R138                                         | 1                    |                      |
| R169                  | 341-0333       | . RESISTOR, Fxd, cmpsn, 33 k ohms $\pm 5\%$ , 1/4 W    | 1                    |                      |
| R170                  | 341-0303       | . RESISTOR, Fxd, cmpsn, 30 k ohms $\pm 5\%$ , 1/4 W    | 1                    |                      |
| R171                  | 44310-0103     | . Same as R160                                         | 1                    |                      |
| R172                  | 341-0151       | . RESISTOR, Fxd, cmpsn, 150 ohms $\pm 5\%$ , 1/4 W     | 1                    |                      |
| R173                  | 341-0512       | . Same as R39                                          | 1                    |                      |
| R174                  | 341-0512       | . Same as R39                                          | 1                    |                      |
| R175                  | 341-0473       | . Same as R50                                          | 1                    |                      |
| R176                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R177                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R178                  | 341-0105       | . Same as R29                                          | 1                    |                      |
| R179                  | 341-0105       | . Same as R29                                          | 1                    |                      |





*Figure 7-2. A2, Computer/Converter Assembly, Parts Location Diagram*



| Figure &<br>Index No. | Part<br>Number | Description<br>1 2 3 4 5 6                             | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|--------------------------------------------------------|----------------------|----------------------|
| 7-2-R125              | 341-0512       | . Same as R39                                          | 1                    |                      |
| R126                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R127                  | 341-0105       | . Same as R29                                          | 1                    |                      |
| R128                  | 43294-1004     | . RESISTOR, Fxd, film, 10 k ohms $\pm 0.1\%$ , 1/4 W   | 1                    |                      |
| R129                  | 341-0103       | . Same as R4                                           | 1                    |                      |
| R130                  | 43294-1004     | . Same as R128                                         | 1                    |                      |
| R131                  | 341-0393       | . RESISTOR, Fxd, cmpsn, 39 k ohms $\pm 5\%$ , 1/4 W    | 1                    |                      |
| R132                  | 341-0393       | . Same as R131                                         | 1                    |                      |
| R133                  | 341-0393       | . Same as R131                                         | 1                    |                      |
| R134                  | 39319-1335     | . RESISTOR, Fxd, film, 133 k ohms $\pm 1\%$ , 1/4 W    | 1                    |                      |
| R135                  | 341-0623       | . Same as R8                                           | 1                    |                      |
| R136                  | 341-0106       | . RESISTOR, Fxd, cmpsn, 10 meg ohms $\pm 5\%$ , 1/4 W  | 1                    |                      |
| R137                  | 341-0225       | . RESISTOR, Fxd, cmpsn, 2.2 meg ohms $\pm 5\%$ , 1/4 W | 1                    |                      |
| R138                  | 44310-0503     | . RESISTOR, Fxd, cmpsn, 50 k ohms $\pm 5\%$ , 1/4 W    | 1                    |                      |
| R139                  | 341-0105       | . Same as R29                                          | 1                    |                      |
| R140                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R141                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R142                  | 341-0512       | . Same as R39                                          | 1                    |                      |
| R143                  | 341-0512       | . Same as R39                                          | 1                    |                      |
| R144                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R145                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R146                  | 341-0105       | . Same as R29                                          | 1                    |                      |
| R147                  | 341-0103       | . Same as R4                                           | 1                    |                      |
| R148                  | 341-9271       | . RESISTOR, Fxd, cmpsn, 2.7 ohms $\pm 5\%$ , 1/4 W     | 1                    |                      |
| R149                  | 341-0512       | . Same as R39                                          | 1                    |                      |
| R150                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R151                  | 341-0222       | . Same as R7                                           | 1                    |                      |
| R152                  | 341-0105       | . Same as R29                                          | 1                    |                      |
| R153                  | 44473-0103     | . RESISTOR, Var, 10 k ohms $\pm 10\%$ , 1/2 W          | 1                    |                      |
| R154                  | 39319-2004     | . Same as R19                                          | 1                    |                      |
| R155                  | 39319-2004     | . Same as R19                                          | 1                    |                      |
| R156                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R157                  | 341-0103       | . Same as R4                                           | 1                    |                      |
| R158                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R159                  | 341-0393       | . Same as R131                                         | 1                    |                      |
| R160                  | 44310-0103     | . RESISTOR, Var, 10 k ohms $\pm 10\%$ , 1/2 W          | 1                    |                      |
| R161                  | 44310-0103     | . Same as R160                                         | 1                    |                      |
| R162                  | 341-0105       | . Same as R29                                          | 1                    |                      |
| R163                  | 39319-3924     | . Same as R112                                         | 1                    |                      |
| R164                  | 39319-3324     | . RESISTOR, Fxd, film, 33.2 k ohms $\pm 1\%$ , 1/4 W   | 1                    |                      |
| R165                  | 44310-0103     | . Same as R160                                         | 1                    |                      |
| R166                  | 341-0105       | . Same as R29                                          | 1                    |                      |
| R167                  | 39319-9094     | . Same as R104                                         | 1                    |                      |
| R168                  | 44310-0503     | . Same as R138                                         | 1                    |                      |
| R169                  | 341-0333       | . RESISTOR, Fxd, cmpsn, 33 k ohms $\pm 5\%$ , 1/4 W    | 1                    |                      |
| R170                  | 341-0303       | . RESISTOR, Fxd, cmpsn, 30 k ohms $\pm 5\%$ , 1/4 W    | 1                    |                      |
| R171                  | 44310-0103     | . Same as R160                                         | 1                    |                      |
| R172                  | 341-0151       | . RESISTOR, Fxd, cmpsn, 150 ohms $\pm 5\%$ , 1/4 W     | 1                    |                      |
| R173                  | 341-0512       | . Same as R39                                          | 1                    |                      |
| R174                  | 341-0512       | . Same as R39                                          | 1                    |                      |
| R175                  | 341-0473       | . Same as R50                                          | 1                    |                      |
| R176                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R177                  | 341-0203       | . Same as R41                                          | 1                    |                      |
| R178                  | 341-0105       | . Same as R29                                          | 1                    |                      |
| R179                  | 341-0105       | . Same as R29                                          | 1                    |                      |

| Figure &<br>Index No. | Part<br>Number | Description                                        | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|----------------------------------------------------|----------------------|----------------------|
|                       |                | 1 2 3 4 5 6                                        |                      |                      |
| 7-2-R180              | 341-0473       | Same as R50                                        | 1                    |                      |
| R181                  | 341-0103       | Same as R4                                         | 1                    |                      |
| R182                  | 44473-0202     | Same as R67                                        | 1                    |                      |
| R183                  | 341-0223       | Same as R63                                        | 1                    |                      |
| R184                  | 341-0473       | Same as R50                                        | 1                    |                      |
| R185                  | 341-0103       | Same as R4                                         | 1                    |                      |
| R186                  | 341-0472       | Same as R12                                        | 1                    |                      |
| R187                  | 341-0103       | Same as R4                                         | 1                    |                      |
| R188                  | 341-0104       | Same as R2                                         | 1                    |                      |
| R189                  | 341-0102       | Same as R10                                        | 1                    |                      |
| R190                  | 341-0203       | Same as R41                                        | 1                    |                      |
| R191                  | 341-0472       | Same as R12                                        | 1                    |                      |
| R192                  | 341-0472       | Same as R12                                        | 1                    |                      |
| R193                  | 341-0103       | Same as R4                                         | 1                    |                      |
| R194                  | 341-0222       | Same as R7                                         | 1                    |                      |
| R195                  | 341-0103       | Same as R4                                         | 1                    |                      |
| R196                  | 341-0103       | Same as R4                                         | 1                    |                      |
| R197                  | 341-0472       | Same as R12                                        | 1                    |                      |
| R198                  | 341-0472       | Same as R12                                        | 1                    |                      |
| R199                  | 341-0682       | RESISTOR, Fxd, cmpsn, 6.8 k ohms $\pm 5\%$ , 1/4 W | 1                    |                      |
| U1                    | 42693-0000     | INTEGRATED CIRCUIT, Type N5558V                    | 1                    |                      |
| U2                    | 43454-4121     | INTEGRATED CIRCUIT, Type SN121J                    | 1                    |                      |
| U3                    | 42693-0000     | Same as U1                                         | 1                    |                      |
| U4                    | 41753-0005     | INTEGRATED CIRCUIT, Type SN72741P                  | 1                    |                      |
| U5                    | 42693-0000     | Same as U1                                         | 1                    |                      |
| U6                    | 43792-4011     | INTEGRATED CIRCUIT, Type MCM14011CL                | 1                    |                      |
| U7                    | 41753-0005     | Same as U4                                         | 1                    |                      |
| U8                    | 41753-0005     | Same as U4                                         | 1                    |                      |
| U9                    | 43438-0001     | INTEGRATED CIRCUIT, Type LM301AN                   | 1                    |                      |
| U10                   | 42693-0000     | Same as U1                                         | 1                    |                      |
| U11                   | 43438-0001     | Same as U9                                         | 1                    |                      |
| U12                   | 43792-4001     | INTEGRATED CIRCUIT, Type MCM14001CL                | 1                    |                      |
| U13                   | 43792-4011     | Same as U6                                         | 1                    |                      |
| U14                   | 43792-4011     | Same as U6                                         | 1                    |                      |
| U15                   | 42693-0000     | Same as U1                                         | 1                    |                      |
| U16                   | 42693-0000     | Same as U1                                         | 1                    |                      |
| U17                   | 42693-0000     | Same as U1                                         | 1                    |                      |
| U18                   | 41753-0005     | Same as U4                                         | 1                    |                      |
| U19                   | 43438-0001     | Same as U9                                         | 1                    |                      |
| U20                   | 41753-0005     | Same as U4                                         | 1                    |                      |
| U21                   | 42693-0000     | Same as U1                                         | 1                    |                      |
| U22                   | 43792-4011     | Same as U6                                         | 1                    |                      |
| U23                   | 42693-0000     | Same as U1                                         | 1                    |                      |
| U24                   | 43792-4507     | INTEGRATED CIRCUIT, Type MCM14507CL                | 1                    |                      |
| U25                   | 43792-4528     | INTEGRATED CIRCUIT, Type MCM14528CL                | 1                    |                      |
| U26                   | 41753-0005     | Same as U4                                         | 1                    |                      |
| U27                   | 43438-0001     | Same as U9                                         | 1                    |                      |
| U28                   | 41753-0005     | Same as U4                                         | 1                    |                      |

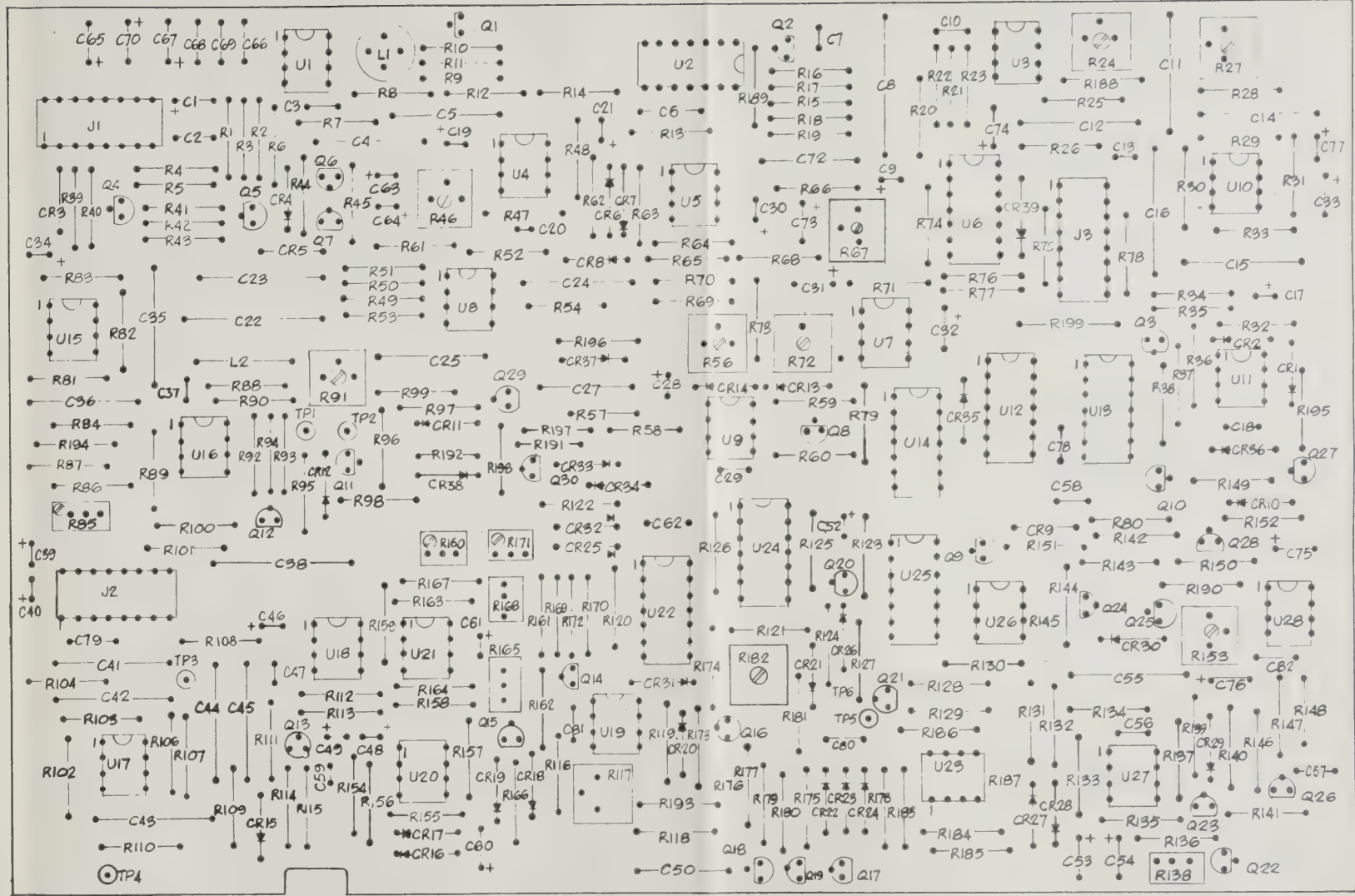


Figure 7-2. A2, Computer/Converter Assembly, Parts Location Diagram





| Figure &<br>Index No. | Part<br>Number | Description                                                         | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|---------------------------------------------------------------------|----------------------|----------------------|
|                       |                | 1 2 3 4 5 6                                                         |                      |                      |
| 7-3-                  | 44120-0000     | LOCALIZER, DVM, Dimmer, assembly A3 (See Fig 7-1 -12 for NHA) . .   | REF                  |                      |
| CR4                   | 32433-0005     | . SEMICONDUCTOR DEVICE, Diode, Type IN916 . . . . .                 | 1                    |                      |
| CR5                   | 32433-0005     | . Same as CR4 . . . . .                                             | 1                    |                      |
| CR6                   | 32433-0005     | . Same as CR4 . . . . .                                             | 1                    |                      |
| CR7                   | 32433-0005     | . Same as CR4 . . . . .                                             | 1                    |                      |
| CR8                   | 32433-0005     | . Same as CR4 . . . . .                                             | 1                    |                      |
| C1                    | 40248-2371     | . CAPACITOR, Fxd, mtlc, 15 $\mu$ F $\pm$ 20%, 35 Vdc . . . . .      | 1                    |                      |
| C2                    | 40248-2512     | . CAPACITOR, Fxd, mtlc, 10 $\mu$ F $\pm$ 20%, 25 Vdc . . . . .      | 1                    |                      |
| C8                    | 42536-1102     | . CAPACITOR, Fxd, plastic, 0.1 $\mu$ F $\pm$ 10%, 100 Vdc . . . . . | 1                    |                      |
| C9                    | 39130-1105     | . CAPACITOR, Fxd, plastic, 1 $\mu$ F $\pm$ 10%, 200 Vdc . . . . .   | 1                    |                      |
| C10                   | 41915-0103     | . CAPACITOR, Fxd, cer, 10,000 pF $\pm$ 20%, 18 Vdc . . . . .        | 1                    |                      |
| C11                   | 30949-0472     | . CAPACITOR, Fxd, cer, 4700 pF $\pm$ 10%, 200 Vdc . . . . .         | 1                    |                      |
| C13                   | 40248-2371     | . Same as C1 . . . . .                                              | 1                    |                      |
| C14                   | 40248-2512     | . Same as C2 . . . . .                                              | 1                    |                      |
| C16                   | 40248-2155     | . CAPACITOR, Fxd, mtlc, 3.3 $\mu$ F $\pm$ 20%, 15 Vdc . . . . .     | 1                    |                      |
| C17                   | 36294-0274     | . Same as C11 . . . . .                                             | 1                    |                      |
| C18                   | 36294-0274     | . Same as C11 . . . . .                                             | 1                    |                      |
| C19                   | 40248-2371     | . Same as C1 . . . . .                                              | 1                    |                      |
| C20                   | 40248-2371     | . Same as C1 . . . . .                                              | 1                    |                      |
| C22                   | 40248-2173     | . CAPACITOR, Fxd, mtlc, 68 $\mu$ F $\pm$ 20%, 15 Vdc . . . . .      | 1                    |                      |
| C23                   | 40248-2173     | . Same as C22 . . . . .                                             | 1                    |                      |
| C24                   | 40248-2220     | . CAPACITOR, Fxd, mtlc, 47 $\mu$ F $\pm$ 20%, 20 Vdc . . . . .      | 1                    |                      |
| C25                   | 40248-2220     | . Same as C24 . . . . .                                             | 1                    |                      |
| C26                   | 40248-2516     | . CAPACITOR, Fxd, mtlc, 22 $\mu$ F $\pm$ 20%, 25 Vdc . . . . .      | 1                    |                      |
| C27                   | 31456-9102     | . CAPACITOR, Fxd, cer, 0.1 $\mu$ F +80% -20%, 25 Vdc . . . . .      | 1                    |                      |
| C28                   | 27698-0100     | . CAPACITOR, Fxd, cer, 10 pF $\pm$ 5%, 500 Vdc . . . . .            | 1                    |                      |
| C29                   | 40248-2516     | . Same as C26 . . . . .                                             | 1                    |                      |
| C30                   | 40248-2371     | . Same as C1 . . . . .                                              | 1                    |                      |
| C32                   | 30949-0682     | . CAPACITOR, Fxd, cer, 6800 pF $\pm$ 10%, 200 Vdc . . . . .         | 1                    |                      |
| DS1                   | 42465-0001     | . LAMP . . . . .                                                    | 1                    |                      |
| DS2                   | 42465-0001     | . Same as DS1 . . . . .                                             | 1                    |                      |
| J1                    | 42461-1016     | . SOCKET . . . . .                                                  | 1                    |                      |
| J2                    | 42461-1016     | . Same as J1 . . . . .                                              | 1                    |                      |
| J3                    | 42461-1016     | . Same as J1 . . . . .                                              | 1                    |                      |
| J4                    | 42442-4113     | . CONNECTOR . . . . .                                               | 1                    |                      |
| Q6                    | 36962-4126     | . TRANSISTOR, Type 2N4126 . . . . .                                 | 1                    |                      |
| Q7                    | 36961-4124     | . TRANSISTOR, Type 2N4124 . . . . .                                 | 1                    |                      |
| Q8                    | 36961-4124     | . Same as Q7 . . . . .                                              | 1                    |                      |
| Q9                    | 36961-4124     | . Same as Q7 . . . . .                                              | 1                    |                      |
| Q10                   | 36961-4124     | . Same as Q7 . . . . .                                              | 1                    |                      |
| Q11                   | 36961-4124     | . Same as Q7 . . . . .                                              | 1                    |                      |
| Q13                   | 36961-4124     | . Same as Q7 . . . . .                                              | 1                    |                      |
| RT1                   | 40651-0000     | . THERMISTOR, 500 ohms $\pm$ 10% . . . . .                          | 1                    |                      |
| R16                   | 39319-2004     | . RESISTOR, Fxd, film, 20 k ohms $\pm$ 1%, 1/4 W . . . . .          | 1                    |                      |
| R17                   | 44310-0103     | . RESISTOR, 10 k ohms $\pm$ 10%, 1/2 W . . . . .                    | 1                    |                      |
| R18                   | 341-0102       | . RESISTOR, Fxd, cmpsn, 1.0 k ohms $\pm$ 5%, 1/4 W . . . . .        | 1                    |                      |
| R19                   | 341-0182       | . RESISTOR, Fxd, cmpsn, 1.8 k ohms $\pm$ 5%, 1/4 W . . . . .        | 1                    |                      |
| R20                   | 341-0203       | . RESISTOR, Fxd, cmpsn, 20 k ohms $\pm$ 5%, 1/4 W . . . . .         | 1                    |                      |
| R21                   | 341-0201       | . RESISTOR, Fxd, cmpsn, 200 ohms $\pm$ 5%, 1/4 W . . . . .          | 1                    |                      |
| R22                   | 341-0203       | . Same as R20 . . . . .                                             | 1                    |                      |
| R23                   | 341-0101       | . RESISTOR, Fxd, cmpsn, 100 ohms $\pm$ 5%, 1/4 W . . . . .          | 1                    |                      |
| R24                   | 44310-0203     | . RESISTOR, Var, 20 k ohms $\pm$ 10%, 1/2 W . . . . .               | 1                    |                      |
| R25                   | 341-0334       | . RESISTOR, Fxd, cmpsn, 330 k ohms $\pm$ 5%, 1/4 W . . . . .        | 1                    |                      |
| R26                   | 341-0472       | . RESISTOR, Fxd, cmpsn, 4.7 k ohms $\pm$ 5%, 1/4 W . . . . .        | 1                    |                      |
| R27                   | 341-0102       | . Same as R18 . . . . .                                             | 1                    |                      |



| Figure &<br>Index No. | Part<br>Number | Description |                                                     |   |   |   |   | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|-------------|-----------------------------------------------------|---|---|---|---|----------------------|----------------------|
|                       |                | 1           | 2                                                   | 3 | 4 | 5 | 6 |                      |                      |
| 7-3-R29               | 341-0682       | .           | RESISTOR, Fxd, cmpsn, 6.8 k ohms $\pm 5\%$ , 1/4 W  | . | . | . | . | 1                    |                      |
| R31                   | 341-0150       | .           | RESISTOR, Fxd, cmpsn, 15 ohms $\pm 5\%$ , 1/4 W     | . | . | . | . | 1                    |                      |
| R32                   | 341-0393       | .           | RESISTOR, Fxd, cmpsn, 39 k ohms $\pm 5\%$ , 1/4 W   | . | . | . | . | 1                    |                      |
| R33                   | 341-0512       | .           | RESISTOR, Fxd, cmpsn, 5.1 k ohms $\pm 5\%$ , 1/4 W  | . | . | . | . | 1                    |                      |
| R34                   | 341-0472       | .           | Same as R26                                         | . | . | . | . | 1                    |                      |
| R36                   | 44473-0202     | .           | RESISTOR, Var, 2 k ohms $\pm 10\%$ , 1/2 W          | . | . | . | . | 1                    |                      |
| R37                   | 341-0512       | .           | Same as R33                                         | . | . | . | . | 1                    |                      |
| R38                   | 341-0682       | .           | Same as R29                                         | . | . | . | . | 1                    |                      |
| R39                   | 341-0512       | .           | Same as R33                                         | . | . | . | . | 1                    |                      |
| R40                   | 341-0910       | .           | RESISTOR, Fxd, cmpsn, 91 ohms $\pm 5\%$ , 1/4 W     | . | . | . | . | 1                    |                      |
| R41                   | 341-0103       | .           | RESISTOR, Fxd, cmpsn, 10 k ohms $\pm 5\%$ , 1/4 W   | . | . | . | . | 1                    |                      |
| R42                   | 44473-0103     | .           | RESISTOR, Var, 10 k ohms $\pm 10\%$ , 1/2 W         | . | . | . | . | 1                    |                      |
| R43                   | 44473-0503     | .           | RESISTOR, Var, 50 k ohms $\pm 10\%$ , 1/2 W         | . | . | . | . | 1                    |                      |
| R44                   | 341-0103       | .           | Same as R41                                         | . | . | . | . | 1                    |                      |
| R45                   | 341-0103       | .           | Same as R41                                         | . | . | . | . | 1                    |                      |
| R46                   | 341-0226       | .           | RESISTOR, Fxd, cmpsn, 22 meg ohms $\pm 5\%$ , 1/4 W | . | . | . | . | 1                    |                      |
| R47                   | 341-0103       | .           | Same as R41                                         | . | . | . | . | 1                    |                      |
| R48                   | 341-0103       | .           | Same as R44                                         | . | . | . | . | 1                    |                      |
| R49                   | 341-0222       | .           | RESISTOR, Fxd, cmpsn, 2.2 k ohms $\pm 5\%$ , 1/4 W  | . | . | . | . | 1                    |                      |
| R50                   | 341-0103       | .           | Same as R41                                         | . | . | . | . | 1                    |                      |
| R52                   | 341-0222       | .           | Same as R49                                         | . | . | . | . | 1                    |                      |
| R53                   | 341-0122       | .           | RESISTOR, Fxd, cmpsn, 1.2 k ohms $\pm 5\%$ , 1/4 W  | . | . | . | . | 1                    |                      |
| R54                   | 341-0220       | .           | RESISTOR, Fxd, cmpsn, 22 ohms $\pm 5\%$ , 1/4 W     | . | . | . | . | 1                    |                      |
| R55                   | 341-0102       | .           | Same as R18                                         | . | . | . | . | 1                    |                      |
| R56                   | 44473-0102     | .           | RESISTOR, Var, 1 k ohms $\pm 10\%$ , 1/2 W          | . | . | . | . | 1                    |                      |
| R57                   | 341-0273       | .           | RESISTOR, Fxd, cmpsn, 27 k ohms $\pm 5\%$ , 1/4 W   | . | . | . | . | 1                    |                      |
| R58                   | 341-0103       | .           | Same as R41                                         | . | . | . | . | 1                    |                      |
| R59                   | 341-0332       | .           | RESISTOR, Fxd, cmpsn, 3.3 k ohms $\pm 5\%$ , 1/4 W  | . | . | . | . | 1                    |                      |
| R60                   | 341-0821       | .           | RESISTOR, Fxd, cmpsn, 820 ohms $\pm 5\%$ , 1/4 W    | . | . | . | . | 1                    |                      |
| R61                   | 341-0621       | .           | RESISTOR, Fxd, cmpsn, 620 ohms $\pm 5\%$ , 1/4 W    | . | . | . | . | 1                    |                      |
| T1                    | 40415-0000     | .           | TRANSFORMER                                         | . | . | . | . | 1                    |                      |
| T2                    | 40414-0000     | .           | TRANSFORMER                                         | . | . | . | . | 1                    |                      |
| U4                    | 41753-0005     | .           | INTEGRATED CIRCUIT                                  | . | . | . | . | 1                    |                      |
| U5                    | 43564-0001     | .           | INTEGRATED CIRCUIT                                  | . | . | . | . | 1                    |                      |
| U6                    | 43454-1400     | .           | INTEGRATED CIRCUIT                                  | . | . | . | . | 1                    |                      |
| U9                    | 43454-1400     | .           | Same as U6                                          | . | . | . | . | 1                    |                      |
| U10                   | 43454-4121     | .           | INTEGRATED CIRCUIT                                  | . | . | . | . | 1                    |                      |
| U12                   | 44953-0000     | .           | INTEGRATED CIRCUIT                                  | . | . | . | . | 1                    |                      |
| U13                   | 42693-0000     | .           | INTEGRATED CIRCUIT                                  | . | . | . | . | 1                    |                      |
| U15                   | 42693-0000     | .           | Same as U13                                         | . | . | . | . | 1                    |                      |
| VR1                   | 43876-2056     | .           | DIODE, Zener                                        | . | . | . | . | 1                    |                      |
| VR2                   | 35954-9681     | .           | DIODE, Zener                                        | . | . | . | . | 1                    |                      |
| -1                    | 37226-0002     | .           | FILTER                                              | . | . | . | . | 2                    |                      |
| -2                    | 44157-0000     | .           | SOCKET AND BRACKET ASSEMBLY                         | . | . | . | . | 1                    |                      |
| -3                    | 44177-0000     | .           | SOCKET AND BRACKET ASSEMBLY                         | . | . | . | . | 1                    |                      |
| -4                    | 235-0008       | .           | RIVET                                               | . | . | . | . | 6                    |                      |
| -5                    | 40597-8091     | .           | CONTACT, Elec                                       | . | . | . | . | 1                    |                      |
| -6                    | 44176-0000     | .           | TERMINAL                                            | . | . | . | . | 4                    |                      |
| -8                    | 44155-0000     | .           | BRACKET                                             | . | . | . | . | 2                    |                      |

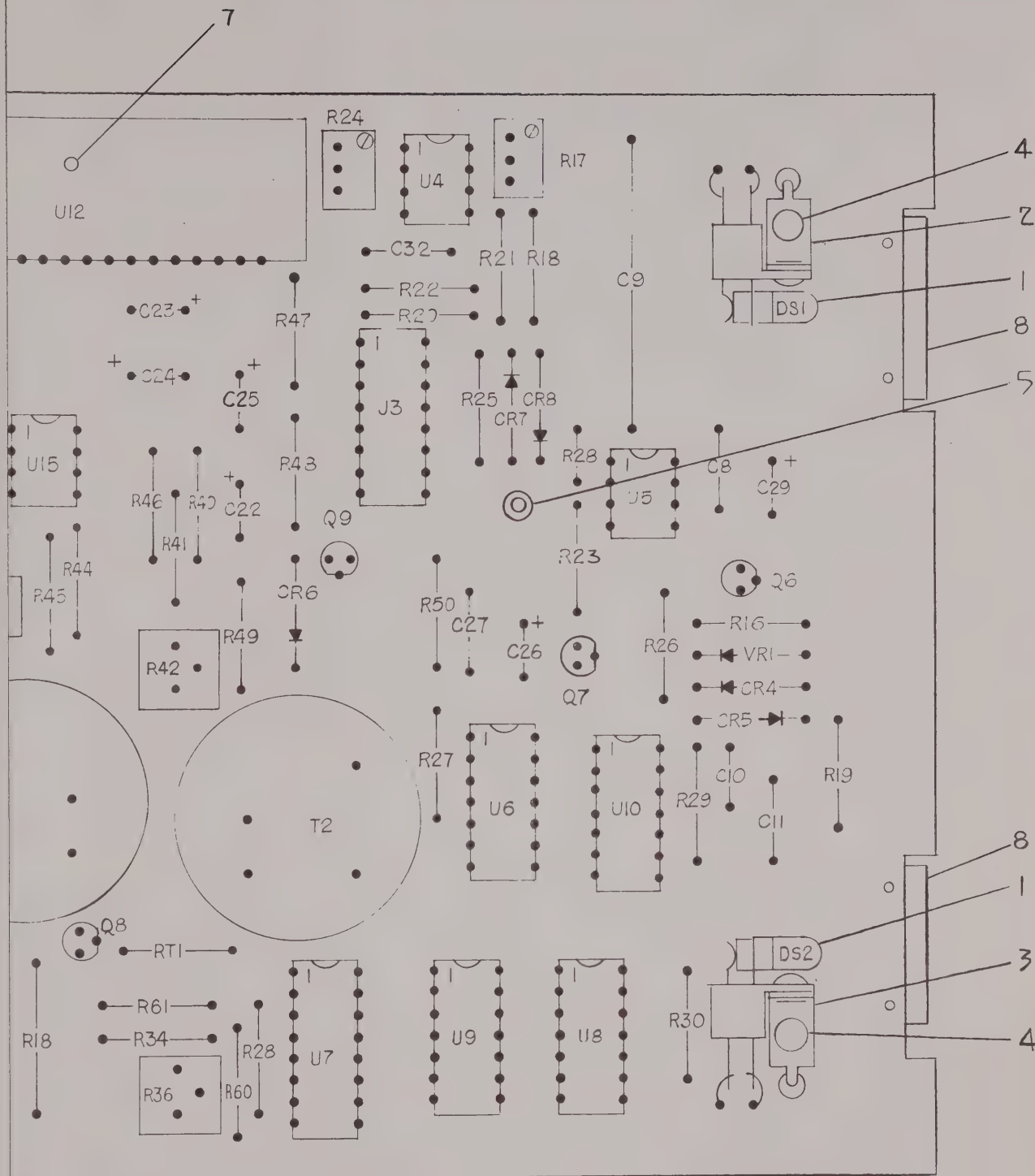


Figure 7-3. A3, Localizer, DVM, Dimmer Assembly, Parts Location Diagram

| Figure &<br>Index No. | Part<br>Number | Description<br>1 2 3 4 5 6                                      | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|-----------------------------------------------------------------|----------------------|----------------------|
| 7-3-R29               | 341-0682       | . RESISTOR, Fxd, cmpsn, 6.8 k ohms $\pm 5\%$ , 1/4 W . . . . .  | 1                    |                      |
| R31                   | 341-0150       | . RESISTOR, Fxd, cmpsn, 15 ohms $\pm 5\%$ , 1/4 W . . . . .     | 1                    |                      |
| R32                   | 341-0393       | . RESISTOR, Fxd, cmpsn, 39 k ohms $\pm 5\%$ , 1/4 W . . . . .   | 1                    |                      |
| R33                   | 341-0512       | . RESISTOR, Fxd, cmpsn, 5.1 k ohms $\pm 5\%$ , 1/4 W . . . . .  | 1                    |                      |
| R34                   | 341-0472       | . Same as R26 . . . . .                                         | 1                    |                      |
| R36                   | 44473-0202     | . RESISTOR, Var, 2 k ohms $\pm 10\%$ , 1/2 W . . . . .          | 1                    |                      |
| R37                   | 341-0512       | . Same as R33 . . . . .                                         | 1                    |                      |
| R38                   | 341-0682       | . Same as R29 . . . . .                                         | 1                    |                      |
| R39                   | 341-0512       | . Same as R33 . . . . .                                         | 1                    |                      |
| R40                   | 341-0910       | . RESISTOR, Fxd, cmpsn, 91 ohms $\pm 5\%$ , 1/4 W . . . . .     | 1                    |                      |
| R41                   | 341-0103       | . RESISTOR, Fxd, cmpsn, 10 k ohms $\pm 5\%$ , 1/4 W . . . . .   | 1                    |                      |
| R42                   | 44473-0103     | . RESISTOR, Var, 10 k ohms $\pm 10\%$ , 1/2 W . . . . .         | 1                    |                      |
| R43                   | 44473-0503     | . RESISTOR, Var, 50 k ohms $\pm 10\%$ , 1/2 W . . . . .         | 1                    |                      |
| R44                   | 341-0103       | . Same as R41 . . . . .                                         | 1                    |                      |
| R45                   | 341-0103       | . Same as R41 . . . . .                                         | 1                    |                      |
| R46                   | 341-0226       | . RESISTOR, Fxd, cmpsn, 22 meg ohms $\pm 5\%$ , 1/4 W . . . . . | 1                    |                      |
| R47                   | 341-0103       | . Same as R41 . . . . .                                         | 1                    |                      |
| R48                   | 341-0103       | . Same as R44 . . . . .                                         | 1                    |                      |
| R49                   | 341-0222       | . RESISTOR, Fxd, cmpsn, 2.2 k ohms $\pm 5\%$ , 1/4 W . . . . .  | 1                    |                      |
| R50                   | 341-0103       | . Same as R41 . . . . .                                         | 1                    |                      |
| R52                   | 341-0222       | . Same as R49 . . . . .                                         | 1                    |                      |
| R53                   | 341-0122       | . RESISTOR, Fxd, cmpsn, 1.2 k ohms $\pm 5\%$ , 1/4 W . . . . .  | 1                    |                      |
| R54                   | 341-0220       | . RESISTOR, Fxd, cmpsn, 22 ohms $\pm 5\%$ , 1/4 W . . . . .     | 1                    |                      |
| R55                   | 341-0102       | . Same as R18 . . . . .                                         | 1                    |                      |
| R56                   | 44473-0102     | . RESISTOR, Var, 1 k ohms $\pm 10\%$ , 1/2 W . . . . .          | 1                    |                      |
| R57                   | 341-0273       | . RESISTOR, Fxd, cmpsn, 27 k ohms $\pm 5\%$ , 1/4 W . . . . .   | 1                    |                      |
| R58                   | 341-0103       | . Same as R41 . . . . .                                         | 1                    |                      |
| R59                   | 341-0332       | . RESISTOR, Fxd, cmpsn, 3.3 k ohms $\pm 5\%$ , 1/4 W . . . . .  | 1                    |                      |
| R60                   | 341-0821       | . RESISTOR, Fxd, cmpsn, 820 ohms $\pm 5\%$ , 1/4 W . . . . .    | 1                    |                      |
| R61                   | 341-0621       | . RESISTOR, Fxd, cmpsn, 620 ohms $\pm 5\%$ , 1/4 W . . . . .    | 1                    |                      |
| T1                    | 40415-0000     | . TRANSFORMER . . . . .                                         | 1                    |                      |
| T2                    | 40414-0000     | . TRANSFORMER . . . . .                                         | 1                    |                      |
| U4                    | 41753-0005     | . INTEGRATED CIRCUIT . . . . .                                  | 1                    |                      |
| U5                    | 43564-0001     | . INTEGRATED CIRCUIT . . . . .                                  | 1                    |                      |
| U6                    | 43454-1400     | . INTEGRATED CIRCUIT . . . . .                                  | 1                    |                      |
| U9                    | 43454-1400     | . Same as U6 . . . . .                                          | 1                    |                      |
| U10                   | 43454-4121     | . INTEGRATED CIRCUIT . . . . .                                  | 1                    |                      |
| U12                   | 44953-0000     | . INTEGRATED CIRCUIT . . . . .                                  | 1                    |                      |
| U13                   | 42693-0000     | . INTEGRATED CIRCUIT . . . . .                                  | 1                    |                      |
| U15                   | 42693-0000     | . Same as U13 . . . . .                                         | 1                    |                      |
| VR1                   | 43876-2056     | . DIODE, Zener . . . . .                                        | 1                    |                      |
| VR2                   | 35954-9681     | . DIODE, Zener . . . . .                                        | 1                    |                      |
| -1                    | 37226-0002     | . FILTER . . . . .                                              | 2                    |                      |
| -2                    | 44157-0000     | . SOCKET AND BRACKET ASSEMBLY . . . . .                         | 1                    |                      |
| -3                    | 44177-0000     | . SOCKET AND BRACKET ASSEMBLY . . . . .                         | 1                    |                      |
| -4                    | 235-0008       | . RIVET . . . . .                                               | 6                    |                      |
| -5                    | 40597-8091     | . CONTACT, Elec . . . . .                                       | 1                    |                      |
| -6                    | 44176-0000     | . TERMINAL . . . . .                                            | 4                    |                      |
| -8                    | 44155-0000     | . BRACKET . . . . .                                             | 2                    |                      |

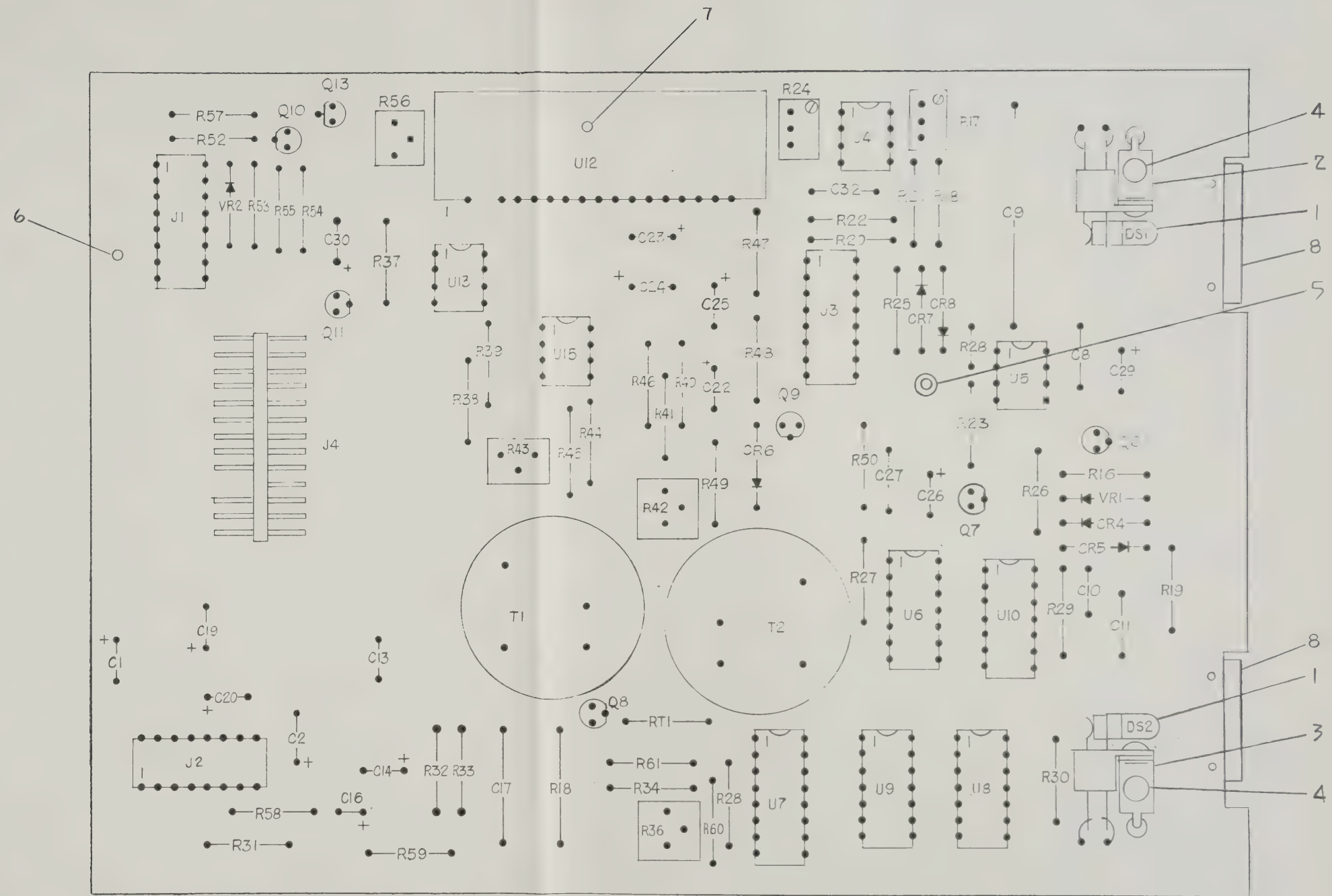


Figure 7-3. A3, Localizer, DVM, Dimmer  
Assembly, Parts Location Diagram





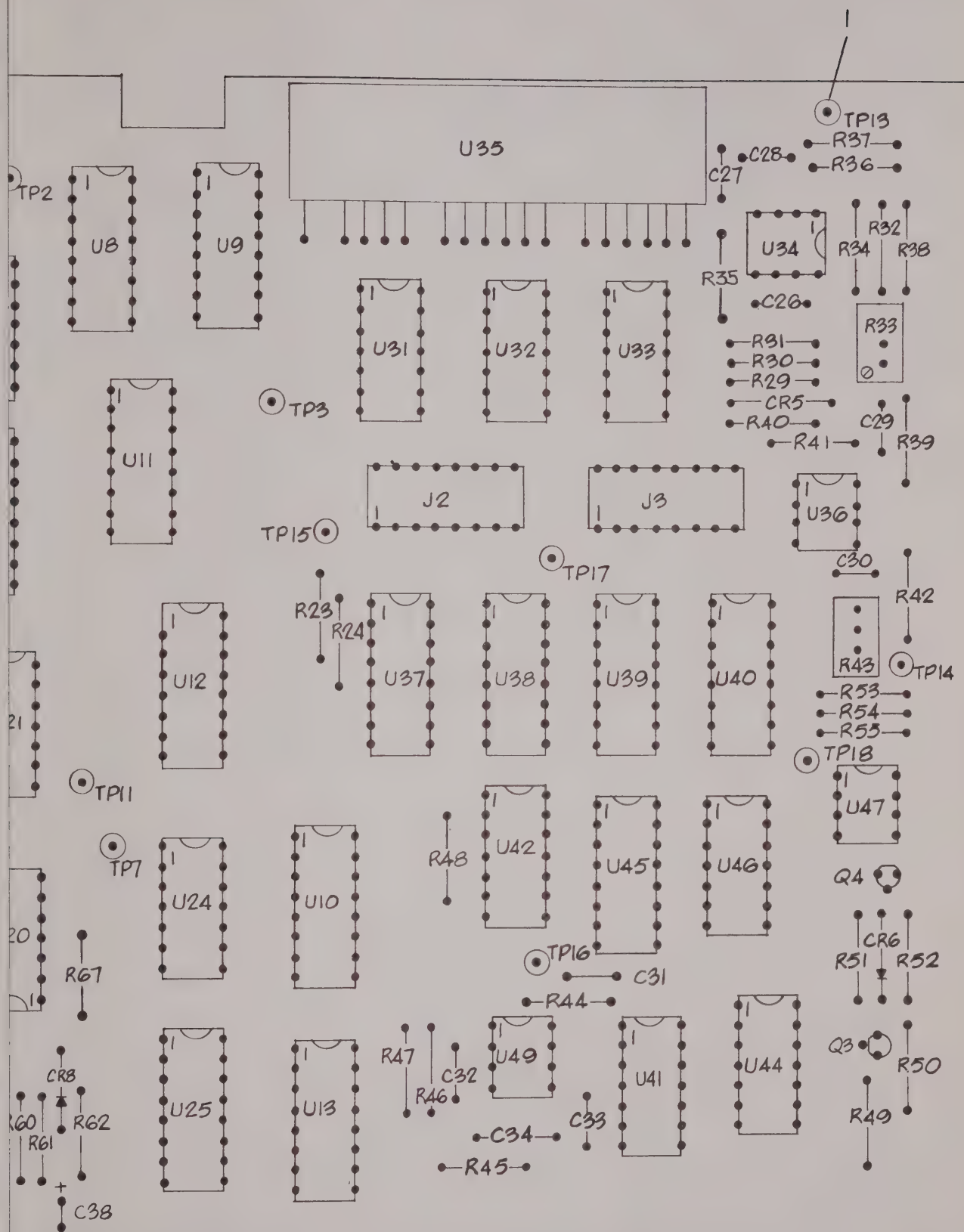
| Figure &<br>Index No. | Part<br>Number | Description<br>1 2 3 4 5 6                                       | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|------------------------------------------------------------------|----------------------|----------------------|
|                       |                |                                                                  |                      |                      |
| 7-4-                  | 44170-0000     | DIGITAL PROCESSOR ASSEMBLY, A5 (See Fig 7-1 -17 for NHA) . . . . | REF                  |                      |
| CR1                   | 32433-0005     | . SEMICONDUCTOR DEVICE, Diode, Type IN916 . . . . .              | 1                    |                      |
| CR2                   | 3441-0000      | . SEMICONDUCTOR DEVICE, Diode, Type IN270 . . . . .              | 1                    |                      |
| CR3                   | 32433-0005     | . Same as CR1 . . . . .                                          | 1                    |                      |
| CR4                   | 32433-0005     | . Same as CR1 . . . . .                                          | 1                    |                      |
| CR5                   | 44137-0000     | . SEMICONDUCTOR DEVICE, Diode, Type IN936 . . . . .              | 1                    |                      |
| CR6                   | 32689-1005     | . SEMICONDUCTOR DEVICE, Diode, Type IN458 . . . . .              | 1                    |                      |
| CR8                   | 32433-0005     | . Same as CR1 . . . . .                                          | 1                    |                      |
| CR9                   | 32433-0005     | . Same as CR1 . . . . .                                          | 1                    |                      |
| C1                    | 40248-2166     | . CAPACITOR, Fxd, mtlc, 22 $\mu$ F $\pm$ 20%, 15 Vdc . . . . .   | 1                    |                      |
| C2                    | 40248-2078     | . CAPACITOR, Fxd, mtlc, 2.2 $\mu$ F $\pm$ 20%, 35 Vdc . . . . .  | 1                    |                      |
| C3                    | 28448-0471     | . CAPACITOR, Fxd, cer, 470 pF $\pm$ 20%, 200 Vdc . . . . .       | 1                    |                      |
| C4                    | 41915-0103     | . CAPACITOR, Fxd, cer, 10,000 pF $\pm$ 20%, 18 Vdc . . . . .     | 1                    |                      |
| C5                    | 28448-0102     | . CAPACITOR, Fxd, cer, 1000 pF $\pm$ 10%, 200 Vdc . . . . .      | 1                    |                      |
| C6                    | 28448-0151     | . CAPACITOR, Fxd, cer, 150 pF $\pm$ 10%, 200 Vdc . . . . .       | 1                    |                      |
| C7                    | 28448-0102     | . Same as C5 . . . . .                                           | 1                    |                      |
| C8                    | 28448-0151     | . Same as C6 . . . . .                                           | 1                    |                      |
| C9                    | 28448-0102     | . Same as C5 . . . . .                                           | 1                    |                      |
| C10                   | 28448-0152     | . CAPACITOR, Fxd, cer, 1500 pF $\pm$ 10%, 200 Vdc . . . . .      | 1                    |                      |
| C11                   | 40248-2516     | . CAPACITOR, Fxd, mtlc, 22 $\mu$ F $\pm$ 20%, 25 Vdc . . . . .   | 1                    |                      |
| C12                   | 41915-0103     | . Same as C4 . . . . .                                           | 1                    |                      |
| C13                   | 41915-0103     | . Same as C4 . . . . .                                           | 1                    |                      |
| C14                   | 40248-2516     | . Same as C11 . . . . .                                          | 1                    |                      |
| C15                   | 41915-0103     | . Same as C4 . . . . .                                           | 1                    |                      |
| C16                   | 40248-2516     | . Same as C11 . . . . .                                          | 1                    |                      |
| C17                   | 27512-0511     | . CAPACITOR, Fxd, mica, 510 pF $\pm$ 5%, 500 Vdc . . . . .       | 1                    |                      |
| C18                   | 40248-2078     | . Same as C2 . . . . .                                           | 1                    |                      |
| C19                   | 40248-2106     | . CAPACITOR, Fxd, mtlc, 4.7 $\mu$ F $\pm$ 20%, 10 Vdc . . . . .  | 1                    |                      |
| C20                   | 41915-0104     | . CAPACITOR, Fxd, cer, 100,000 pF $\pm$ 20%, 18 Vdc . . . . .    | 1                    |                      |
| C21                   | 30949-0471     | . CAPACITOR, Fxd, cer, 470 pF $\pm$ 10%, 200 Vdc . . . . .       | 1                    |                      |
| C22                   | 41915-0103     | . Same as C4 . . . . .                                           | 1                    |                      |
| C23                   | 41915-0103     | . Same as C4 . . . . .                                           | 1                    |                      |
| C24                   | 28448-0151     | . Same as C6 . . . . .                                           | 1                    |                      |
| C25                   | 28448-0151     | . Same as C6 . . . . .                                           | 1                    |                      |
| C26                   | 41915-0103     | . Same as C4 . . . . .                                           | 1                    |                      |
| C27                   | 41915-0103     | . Same as C4 . . . . .                                           | 1                    |                      |
| C28                   | 41915-0103     | . Same as C4 . . . . .                                           | 1                    |                      |
| C29                   | 41915-0103     | . Same as C4 . . . . .                                           | 1                    |                      |
| C30                   | 28448-0470     | . CAPACITOR, Fxd, cer, 47 pF $\pm$ 10%, 200 Vdc . . . . .        | 1                    |                      |
| C31                   | 28448-0152     | . Same as C10 . . . . .                                          | 1                    |                      |
| C32                   | 28448-0471     | . Same as C3 . . . . .                                           | 1                    |                      |
| C33                   | 41915-0103     | . Same as C4 . . . . .                                           | 1                    |                      |
| C34                   | 28448-0681     | . CAPACITOR, Fxd, cer, 680 pF $\pm$ 10%, 200 Vdc . . . . .       | 1                    |                      |
| C35                   | 40248-2177     | . CAPACITOR, Fxd, mtlc, 150 $\mu$ F $\pm$ 20%, 15 Vdc . . . . .  | 1                    |                      |
| C36                   | 40248-1203     | . CAPACITOR, Fxd, mtlc, 2.2 $\mu$ F $\pm$ 10%, 20 Vdc . . . . .  | 1                    |                      |
| C38                   | 40248-2106     | . Same as C19 . . . . .                                          | 1                    |                      |
| C40                   | 40248-2106     | . Same as C19 . . . . .                                          | 1                    |                      |
| C41                   | 41915-0104     | . Same as C20 . . . . .                                          | 1                    |                      |
| C42                   | 41915-0104     | . Same as C20 . . . . .                                          | 1                    |                      |
| C43                   | 28448-0390     | . CAPACITOR, Fxd, cer, 39 pF $\pm$ 10%, 200 Vdc . . . . .        | 1                    |                      |
| J1                    | 42461-1016     | . SOCKET . . . . .                                               | 1                    |                      |
| J2                    | 42461-1016     | . Same as J1 . . . . .                                           | 1                    |                      |
| J3                    | 42461-1016     | . Same as J1 . . . . .                                           | 1                    |                      |
| Q1                    | 36961-4124     | . TRANSISTOR, Type 2N4124 . . . . .                              | 1                    |                      |
| Q2                    | 36961-4124     | . Same as Q1 . . . . .                                           | 1                    |                      |

| Figure &<br>Index No. | Part<br>Number | Description<br>1 2 3 4 5 6                             | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|--------------------------------------------------------|----------------------|----------------------|
| 7-4-Q3                | 36962-4126     | . TRANSISTOR, Type 2N4126                              | 1                    |                      |
| Q4                    | 41123-0057     | . TRANSISTOR, Type TIS-73                              | 1                    |                      |
| Q6                    | 36961-4124     | . Same as Q1                                           | 1                    |                      |
| Q7                    | 36961-4124     | . Same as Q1                                           | 1                    |                      |
| Q8                    | 36961-4124     | . Same as Q1                                           | 1                    |                      |
| Q9                    | 37556-3906     | . TRANSISTOR, Type 2N3906                              | 1                    |                      |
| Q10                   | 37556-3906     | . Same as Q9                                           | 1                    |                      |
| R1                    | 341-0242       | . RESISTOR, Fxd, cmpsn, 2.4 k ohms $\pm 5\%$ , 1/4 W   | 1                    |                      |
| R2                    | 341-0473       | . RESISTOR, Fxd, cmpsn, 47 k ohms $\pm 5\%$ , 1/4 W    | 1                    |                      |
| R3                    | 341-0752       | . RESISTOR, Fxd, cmpsn, 7.5 k ohms $\pm 5\%$ , 1/4 W   | 1                    |                      |
| R4                    | 341-0621       | . RESISTOR, Fxd, cmpsn, 620 ohms $\pm 5\%$ , 1/4 W     | 1                    |                      |
| R5                    | 341-0472       | . RESISTOR, Fxd, cmpsn, 4.7 k ohms $\pm 5\%$ , 1/4 W   | 1                    |                      |
| R6                    | 341-0472       | . Same as R5                                           | 1                    |                      |
| R7                    | 341-0472       | . Same as R5                                           | 1                    |                      |
| R8                    | 341-0754       | . RESISTOR, Fxd, cmpsn, 750 k ohms $\pm 5\%$ , 1/4 W   | 1                    |                      |
| R9                    | 341-0223       | . RESISTOR, Fxd, cmpsn, 22 k ohms $\pm 5\%$ , 1/4 W    | 1                    |                      |
| R10                   | 341-0102       | . RESISTOR, Fxd, cmpsn, 1 k ohms $\pm 5\%$ , 1/4 W     | 1                    |                      |
| R11                   | 341-0222       | . RESISTOR, Fxd, cmpsn, 2.2 k ohms $\pm 5\%$ , 1/4 W   | 1                    |                      |
| R12                   | 341-0473       | . Same as R2                                           | 1                    |                      |
| R13                   | 341-0393       | . RESISTOR, Fxd, cmpsn, 39 k ohms $\pm 5\%$ , 1/4 W    | 1                    |                      |
| R14                   | 341-0103       | . RESISTOR, Fxd, cmpsn, 10 k ohms $\pm 5\%$ , 1/4 W    | 1                    |                      |
| R15                   | 341-0273       | . RESISTOR, Fxd, cmpsn, 27 k ohms $\pm 5\%$ , 1/4 W    | 1                    |                      |
| R16                   | 341-0273       | . Same as R15                                          | 1                    |                      |
| R17                   | 341-0272       | . RESISTOR, Fxd, cmpsn, 2.7 k ohms $\pm 5\%$ , 1/4 W   | 1                    |                      |
| R18                   | 341-0272       | . Same as R17                                          | 1                    |                      |
| R19                   | 341-0103       | . Same as R14                                          | 1                    |                      |
| R20                   | 341-0243       | . RESISTOR, Fxd, cmpsn, 24 k ohms $\pm 5\%$ , 1/4 W    | 1                    |                      |
| R21                   | 341-0683       | . RESISTOR, Fxd, cmpsn, 68 k ohms $\pm 5\%$ , 1/4 W    | 1                    |                      |
| R22                   | 39319-1004     | . RESISTOR, Fxd, film, 10 k ohms $\pm 1\%$ , 1/4 W     | 1                    |                      |
| R23                   | 341-0103       | . Same as R14                                          | 1                    |                      |
| R24                   | 341-0102       | . Same as R10                                          | 1                    |                      |
| R25                   | 44473-0203     | . RESISTOR, Var, 20 k ohms $\pm 10\%$ , 1/2 W          | 1                    |                      |
| R26                   | 341-0473       | . Same as R2                                           | 1                    |                      |
| R27                   | 341-0103       | . Same as R14                                          | 1                    |                      |
| R28                   | 341-0103       | . Same as R14                                          | 1                    |                      |
| R29                   | 341-0751       | . RESISTOR, Fxd, cmpsn, 750 ohms $\pm 5\%$ , 1/4 W     | 1                    |                      |
| R30                   | 39319-6043     | . RESISTOR, Fxd, film, 6040 ohms $\pm 1\%$ , 1/4 W     | 1                    |                      |
| R31                   | 39319-3013     | . RESISTOR, Fxd, film, 3010 ohms $\pm 1\%$ , 1/4 W     | 1                    |                      |
| R32                   | 39319-2493     | . RESISTOR, Fxd, film, 2490 ohms $\pm 1\%$ , 1/4 W     | 1                    |                      |
| R33                   | 44310-0502     | . RESISTOR, Var, 5 k ohms $\pm 10\%$ , 1/2 W           | 1                    |                      |
| R34                   | 39319-3323     | . RESISTOR, Fxd, film, 3320 ohms $\pm 1\%$ , 1/4 W     | 1                    |                      |
| R35                   | 39319-1055     | . RESISTOR, Fxd, film, 105 k ohms $\pm 1\%$ , 1/4 W    | 1                    |                      |
| R36                   | 39319-1055     | . Same as R35                                          | 1                    |                      |
| R37                   | 341-0273       | . Same as R15                                          | 1                    |                      |
| R38                   | 39319-5114     | . RESISTOR, Fxd, film, 51.1 k ohms $\pm 1\%$ , 1/4 W   | 1                    |                      |
| R39                   | 39319-5114     | . Same as R38                                          | 1                    |                      |
| R40                   | 341-0243       | . Same as R20                                          | 1                    |                      |
| R41                   | 341-0106       | . RESISTOR, Fxd, cmpsn, 10 meg ohms $\pm 5\%$ , 1/4 W  | 1                    |                      |
| R42                   | 341-0515       | . RESISTOR, Fxd, cmpsn, 5.1 meg ohms $\pm 5\%$ , 1/4 W | 1                    |                      |
| R43                   | 44310-0503     | . RESISTOR, Var, 50 k ohms $\pm 10\%$ , 1/2 W          | 1                    |                      |
| R44                   | 341-0103       | . Same as R14                                          | 1                    |                      |
| R45                   | 341-0102       | . Same as R10                                          | 1                    |                      |
| R46                   | 341-0203       | . RESISTOR, Fxd, cmpsn, 20 k ohms $\pm 5\%$ , 1/4 W    | 1                    |                      |
| R47                   | 341-0103       | . Same as R14                                          | 1                    |                      |
| R48                   | 341-0102       | . Same as R10                                          | 1                    |                      |

| Figure &<br>Index No. | Part<br>Number | Description |                                                    |   |   |   |   | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|-------------|----------------------------------------------------|---|---|---|---|----------------------|----------------------|
|                       |                | 1           | 2                                                  | 3 | 4 | 5 | 6 |                      |                      |
| 7-4-R49               | 341-0512       | .           | RESISTOR, Fxd, cmpsn, 5.1 k ohms $\pm 5\%$ , 1/4 W | . | . | . | . | 1                    |                      |
| R50                   | 341-0512       | .           | Same as R49                                        | . | . | . | . | 1                    |                      |
| R51                   | 341-0203       | .           | Same as R46                                        | . | . | . | . | 1                    |                      |
| R52                   | 341-0105       | .           | RESISTOR, Fxd, cmpsn, 1 meg ohms $\pm 5\%$ , 1/4 W | . | . | . | . | 1                    |                      |
| R53                   | 39319-1004     | .           | Same as R22                                        | . | . | . | . | 1                    |                      |
| R54                   | 341-0103       | .           | Same as R14                                        | . | . | . | . | 1                    |                      |
| R55                   | 39319-1004     | .           | Same as R22                                        | . | . | . | . | 1                    |                      |
| R56                   | 341-0242       | .           | Same as R1                                         | . | . | . | . | 1                    |                      |
| R57                   | 341-0105       | .           | Same as R52                                        | . | . | . | . | 1                    |                      |
| R58                   | 341-0103       | .           | Same as R14                                        | . | . | . | . | 1                    |                      |
| R60                   | 341-0222       | .           | Same as R11                                        | . | . | . | . | 1                    |                      |
| R61                   | 341-0103       | .           | Same as R14                                        | . | . | . | . | 1                    |                      |
| R62                   | 341-0273       | .           | Same as R15                                        | . | . | . | . | 1                    |                      |
| R63                   | 341-0472       | .           | Same as R5                                         | . | . | . | . | 1                    |                      |
| R64                   | 341-0241       | .           | RESISTOR, Fxd, cmpsn, 240 ohms $\pm 5\%$ , 1/4 W   | . | . | . | . | 1                    |                      |
| R65                   | 341-0472       | .           | Same as R5                                         | . | . | . | . | 1                    |                      |
| R67                   | 341-0103       | .           | Same as R14                                        | . | . | . | . | 1                    |                      |
| R68                   | 341-0106       | .           | Same as R41                                        | . | . | . | . | 1                    |                      |
| R69                   | 341-0103       | .           | Same as R14                                        | . | . | . | . | 1                    |                      |
| R70                   | 341-0103       | .           | Same as R14                                        | . | . | . | . | 1                    |                      |
| R71                   | 341-0223       | .           | Same as R9                                         | . | . | . | . | 1                    |                      |
| R72                   | 341-0103       | .           | Same as R14                                        | . | . | . | . | 1                    |                      |
| R73                   | 341-0103       | .           | Same as R14                                        | . | . | . | . | 1                    |                      |
| U1                    | 43792-4507     | .           | INTEGRATED CIRCUIT                                 | . | . | . | . | 1                    |                      |
| U2                    | 41753-0005     | .           | INTEGRATED CIRCUIT                                 | . | . | . | . | 1                    |                      |
| U3                    | 43792-4011     | .           | INTEGRATED CIRCUIT                                 | . | . | . | . | 1                    |                      |
| U4                    | 41753-0005     | .           | Same as U2                                         | . | . | . | . | 1                    |                      |
| U5                    | 43792-4013     | .           | INTEGRATED CIRCUIT                                 | . | . | . | . | 1                    |                      |
| U6                    | 42537-0001     | .           | INTEGRATED CIRCUIT                                 | . | . | . | . | 1                    |                      |
| U7                    | 43792-4011     | .           | Same as U3                                         | . | . | . | . | 1                    |                      |
| U8                    | 43792-4516     | .           | INTEGRATED CIRCUIT                                 | . | . | . | . | 1                    |                      |
| U9                    | 43792-4516     | .           | Same as U8                                         | . | . | . | . | 1                    |                      |
| U10                   | 43792-4516     | .           | Same as U8                                         | . | . | . | . | 1                    |                      |
| U11                   | 43792-4516     | .           | Same as U8                                         | . | . | . | . | 1                    |                      |
| U12                   | 43792-4516     | .           | Same as U8                                         | . | . | . | . | 1                    |                      |
| U13                   | 43792-4516     | .           | Same as U8                                         | . | . | . | . | 1                    |                      |
| U14                   | 43792-4528     | .           | INTEGRATED CIRCUIT                                 | . | . | . | . | 1                    |                      |
| U15                   | 43438-0001     | .           | INTEGRATED CIRCUIT                                 | . | . | . | . | 1                    |                      |
| U16                   | 43792-4011     | .           | Same as U3                                         | . | . | . | . | 1                    |                      |
| U17                   | 43792-4011     | .           | Same as U3                                         | . | . | . | . | 1                    |                      |
| U18                   | 43792-4012     | .           | INTEGRATED CIRCUIT                                 | . | . | . | . | 1                    |                      |
| U19                   | 43792-4013     | .           | Same as U5                                         | . | . | . | . | 1                    |                      |
| U20                   | 43792-4011     | .           | Same as U3                                         | . | . | . | . | 1                    |                      |
| U21                   | 43792-4012     | .           | Same as U18                                        | . | . | . | . | 1                    |                      |
| U22                   | 43792-4040     | .           | INTEGRATED CIRCUIT                                 | . | . | . | . | 1                    |                      |
| U23                   | 43792-4011     | .           | Same as U3                                         | . | . | . | . | 1                    |                      |
| U24                   | 43792-4012     | .           | Same as U18                                        | . | . | . | . | 1                    |                      |
| U25                   | 43792-4049     | .           | INTEGRATED CIRCUIT                                 | . | . | . | . | 1                    |                      |
| U26                   | 43792-4046     | .           | INTEGRATED CIRCUIT                                 | . | . | . | . | 1                    |                      |
| U27                   | 43792-4013     | .           | Same as U5                                         | . | . | . | . | 1                    |                      |
| U28                   | 43792-4012     | .           | Same as U18                                        | . | . | . | . | 1                    |                      |
| U29                   | 43792-4040     | .           | Same as U22                                        | . | . | . | . | 1                    |                      |
| U30                   | 43792-4528     | .           | Same as U14                                        | . | . | . | . | 1                    |                      |
| U31                   | 43792-4041     | .           | INTEGRATED CIRCUIT                                 | . | . | . | . | 1                    |                      |
| U32                   | 43792-4041     | .           | Same as U31                                        | . | . | . | . | 1                    |                      |
| U33                   | 43792-4041     | .           | Same as U31                                        | . | . | . | . | 1                    |                      |



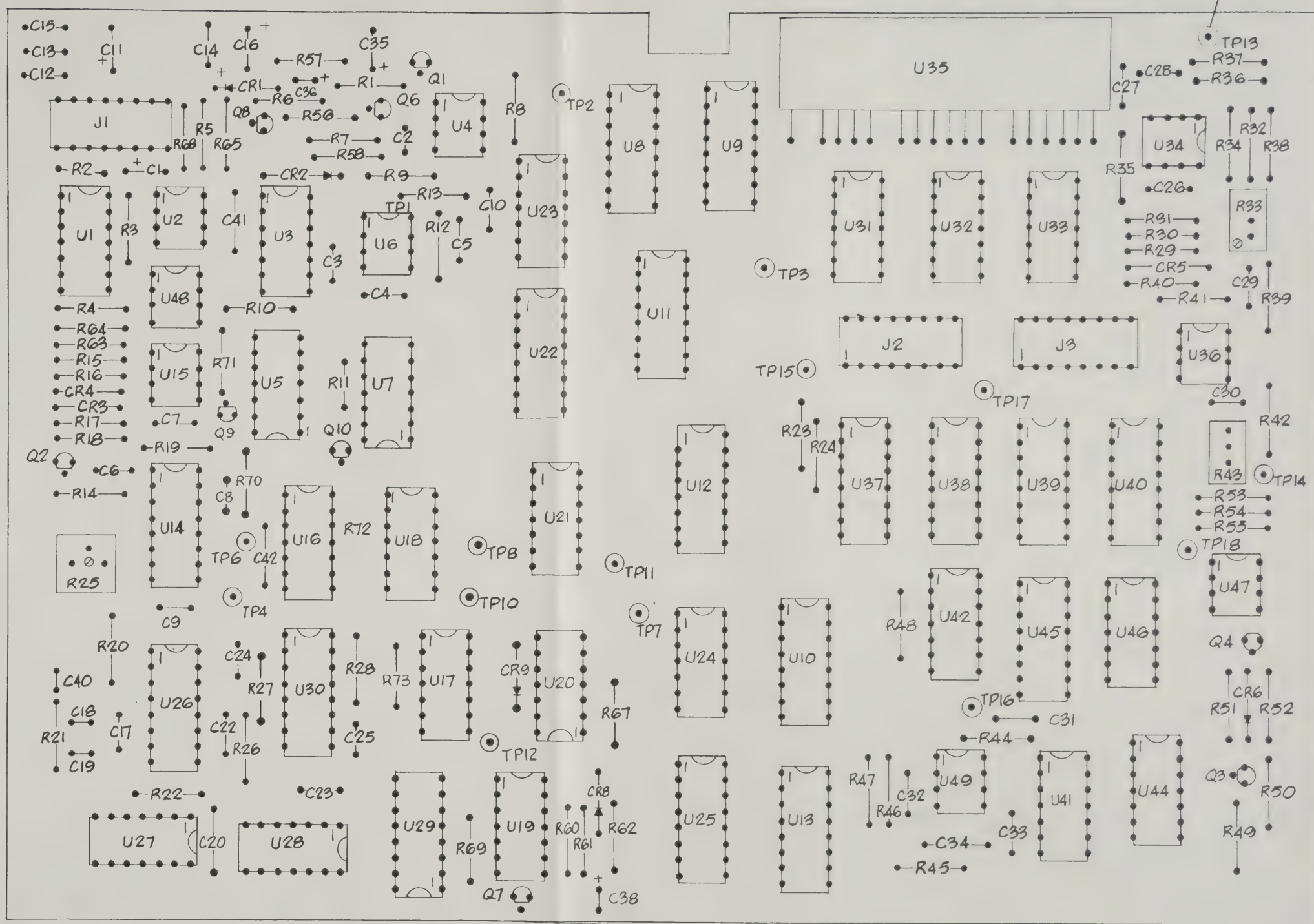
| Figure &<br>Index No. | Part<br>Number | Description |   |   |   |   |                              | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|-------------|---|---|---|---|------------------------------|----------------------|----------------------|
|                       |                | 1           | 2 | 3 | 4 | 5 | 6                            |                      |                      |
| 7-4-U34               | 42693-0000     | .           |   |   |   |   | INTEGRATED CIRCUIT . . . . . | 1                    |                      |
| U35                   | 44395-0000     | .           |   |   |   |   | INTEGRATED CIRCUIT . . . . . | 1                    |                      |
| U36                   | 43438-0001     | .           |   |   |   |   | Same as U15 . . . . .        | 1                    |                      |
| U37                   | 43792-4510     | .           |   |   |   |   | INTEGRATED CIRCUIT . . . . . | 1                    |                      |
| U38                   | 43792-4510     | .           |   |   |   |   | Same as U37 . . . . .        | 1                    |                      |
| U39                   | 43792-4510     | .           |   |   |   |   | Same as U37 . . . . .        | 1                    |                      |
| U40                   | 43792-4510     | .           |   |   |   |   | Same as U37 . . . . .        | 1                    |                      |
| U41                   | 43792-4011     | .           |   |   |   |   | Same as U3 . . . . .         | 1                    |                      |
| U42                   | 43792-4011     | .           |   |   |   |   | Same as U3 . . . . .         | 1                    |                      |
| U43                   | 42537-0001     | .           |   |   |   |   | Same as U6 . . . . .         | 1                    |                      |
| U44                   | 43792-4011     | .           |   |   |   |   | Same as U3 . . . . .         | 1                    |                      |
| U45                   | 43792-4040     | .           |   |   |   |   | Same as U22 . . . . .        | 1                    |                      |
| U46                   | 43792-4012     | .           |   |   |   |   | Same as U18 . . . . .        | 1                    |                      |
| U47                   | 41753-0005     | .           |   |   |   |   | Same as U2 . . . . .         | 1                    |                      |
| U48                   | 43564-0001     | .           |   |   |   |   | INTEGRATED CIRCUIT . . . . . | 1                    |                      |
| -1                    | 40597-8091     | .           |   |   |   |   | CONTACT, Elec . . . . .      | 17                   |                      |
| -2                    | 40590-0571     | .           |   |   |   |   | EYELET . . . . .             | 80                   |                      |



0383-1-15

Figure 7-4. A5, Digital Processor Assembly,  
Part Location Diagram

| Figure &<br>Index No. | Part<br>Number | Description |   |   |   |   |                          | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|-------------|---|---|---|---|--------------------------|----------------------|----------------------|
|                       |                | 1           | 2 | 3 | 4 | 5 | 6                        |                      |                      |
| 7-4-U34               | 42693-0000     | .           |   |   |   |   | INTEGRATED CIRCUIT ..... | 1                    |                      |
| U35                   | 44395-0000     | .           |   |   |   |   | INTEGRATED CIRCUIT ..... | 1                    |                      |
| U36                   | 43438-0001     | .           |   |   |   |   | Same as U15 .....        | 1                    |                      |
| U37                   | 43792-4510     | .           |   |   |   |   | INTEGRATED CIRCUIT ..... | 1                    |                      |
| U38                   | 43792-4510     | .           |   |   |   |   | Same as U37 .....        | 1                    |                      |
| U39                   | 43792-4510     | .           |   |   |   |   | Same as U37 .....        | 1                    |                      |
| U40                   | 43792-4510     | .           |   |   |   |   | Same as U37 .....        | 1                    |                      |
| U41                   | 43792-4011     | .           |   |   |   |   | Same as U3 .....         | 1                    |                      |
| U42                   | 43792-4011     | .           |   |   |   |   | Same as U3 .....         | 1                    |                      |
| U43                   | 42537-0001     | .           |   |   |   |   | Same as U6 .....         | 1                    |                      |
| U44                   | 43792-4011     | .           |   |   |   |   | Same as U3 .....         | 1                    |                      |
| U45                   | 43792-4040     | .           |   |   |   |   | Same as U22 .....        | 1                    |                      |
| U46                   | 43792-4012     | .           |   |   |   |   | Same as U18 .....        | 1                    |                      |
| U47                   | 41753-0005     | .           |   |   |   |   | Same as U2 .....         | 1                    |                      |
| U48                   | 43564-0001     | .           |   |   |   |   | INTEGRATED CIRCUIT ..... | 1                    |                      |
| -1                    | 40597-8091     | .           |   |   |   |   | CONTACT, Elec .....      | 17                   |                      |
| -2                    | 40590-0571     | .           |   |   |   |   | EYELET .....             | 80                   |                      |

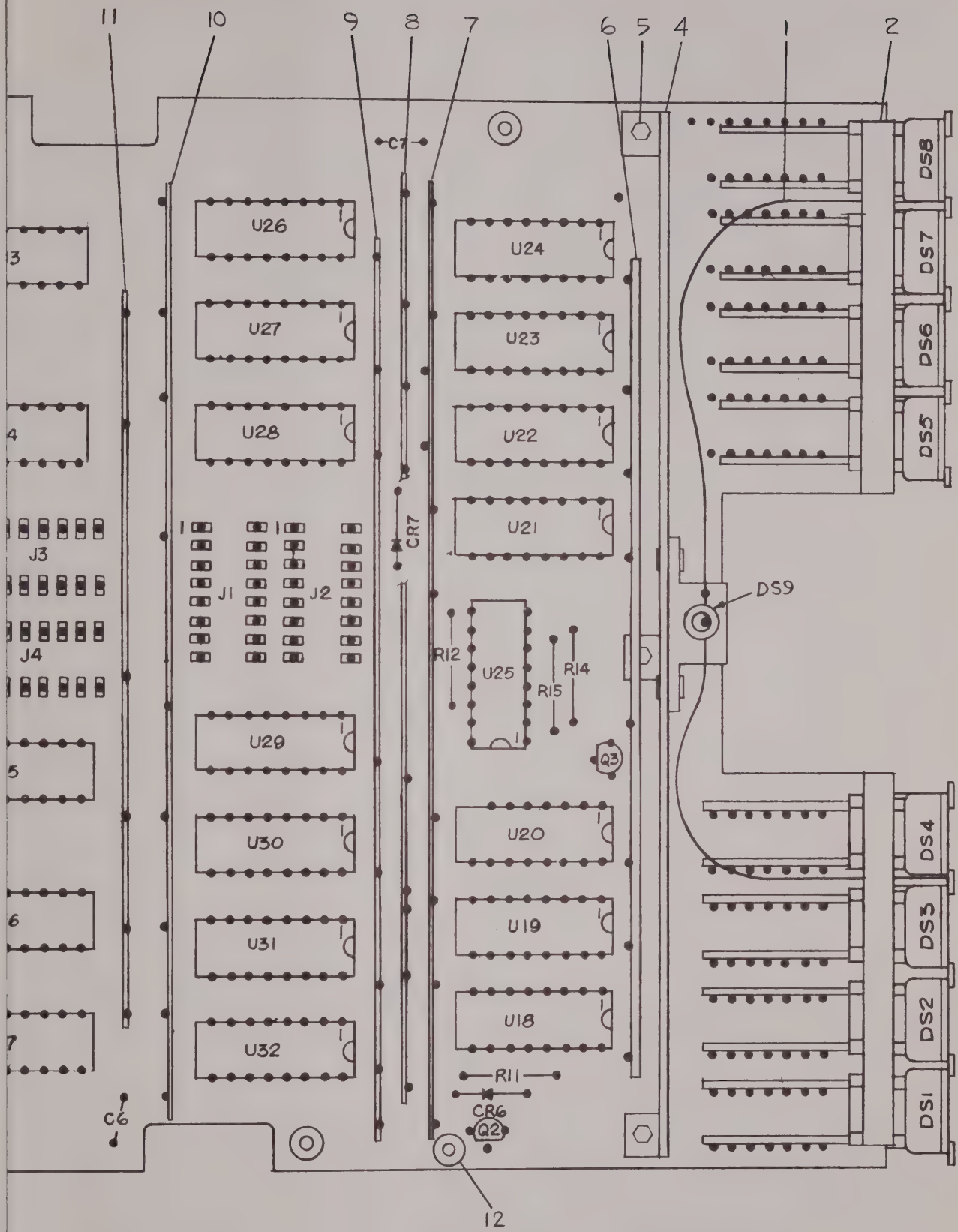






| Figure &<br>Index No. | Part<br>Number | Description                                                      | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|------------------------------------------------------------------|----------------------|----------------------|
|                       |                | 1 2 3 4 5 6                                                      |                      |                      |
| 7-5-                  | 44140-0000     | DISPLAY ASSEMBLY, A4 (See Fig 7-1 -20 for NHA) . . . . .         | REF                  |                      |
| CR1                   | 34410-0000     | . SEMICONDUCTOR DEVICE, Diode, Type IN270 . . . . .              | 1                    |                      |
| CR2                   | 34410-0000     | . Same as CR1 . . . . .                                          | 1                    |                      |
| CR3                   | 34410-0000     | . Same as CR1 . . . . .                                          | 1                    |                      |
| CR4                   | 34410-0000     | . Same as CR1 . . . . .                                          | 1                    |                      |
| CR5                   | 34410-0000     | . Same as CR1 . . . . .                                          | 1                    |                      |
| CR6                   | 34410-0000     | . Same as CR1 . . . . .                                          | 1                    |                      |
| CR7                   | 34410-0000     | . Same as CR1 . . . . .                                          | 1                    |                      |
| CR8                   | 34410-0000     | . Same as CR1 . . . . .                                          | 1                    |                      |
| CR9                   | 34410-0000     | . Same as CR1 . . . . .                                          | 1                    |                      |
| CR10                  | 34410-0000     | . Same as CR1 . . . . .                                          | 1                    |                      |
| C1                    | 40248-1051     | . CAPACITOR, Fxd, mtlc, 0.10 $\mu$ F $\pm$ 10%, 35 Vdc . . . . . | 1                    |                      |
| C2                    | 40248-1074     | . CAPACITOR, Fxd, mtlc, 1.0 $\mu$ F $\pm$ 10%, 35 Vdc . . . . .  | 1                    |                      |
| C3                    | 28448-0471     | . CAPACITOR, Fxd, cer, 470 pF $\pm$ 10%, 20 Vdc . . . . .        | 1                    |                      |
| C4                    | 28448-0471     | . Same as C3 . . . . .                                           | 1                    |                      |
| C5                    | 41915-0103     | . CAPACITOR, Fxd, cer, 0.01 $\mu$ F $\pm$ 20%, 18 Vdc . . . . .  | 1                    |                      |
| C6                    | 41915-0103     | . Same as C5 . . . . .                                           | 1                    |                      |
| C7                    | 41915-0103     | . Same as C5 . . . . .                                           | 1                    |                      |
| C8                    | 40248-2166     | . CAPACITOR, Fxd, mtlc, 22 $\mu$ F $\pm$ 20%, 15 Vdc . . . . .   | 1                    |                      |
| C9                    | 40248-2177     | . CAPACITOR, Fxd, mtlc, 150 $\mu$ F $\pm$ 20%, 15 Vdc . . . . .  | 1                    |                      |
| C10                   | 40248-2211     | . CAPACITOR, Fxd, mtlc, 10 $\mu$ F $\pm$ 20%, 20 Vdc . . . . .   | 1                    |                      |
| DS1                   | 42953-3015     | . LAMP, Display, incandescent . . . . .                          | 1                    |                      |
| DS2                   | 42953-3015     | . Same as DS1 . . . . .                                          | 1                    |                      |
| DS3                   | 42953-3015     | . Same as DS1 . . . . .                                          | 1                    |                      |
| DS4                   | 42953-3015     | . Same as DS1 . . . . .                                          | 1                    |                      |
| DS5                   | 42953-3015     | . Same as DS1 . . . . .                                          | 1                    |                      |
| DS6                   | 42953-3015     | . Same as DS1 . . . . .                                          | 1                    |                      |
| DS7                   | 42953-3015     | . Same as DS1 . . . . .                                          | 1                    |                      |
| DS8                   | 42953-3015     | . Same as DS1 . . . . .                                          | 1                    |                      |
| DS9                   | 32971-0004     | . LAMP, Incandescent . . . . .                                   | 1                    |                      |
| J1                    | 44774-0000     | . TERMINAL . . . . .                                             | 16                   |                      |
| J2                    | 44774-0000     | . Same as J1 . . . . .                                           | 16                   |                      |
| J3                    | 44774-0000     | . Same as J1 . . . . .                                           | 14                   |                      |
| J4                    | 44774-0000     | . Same as J1 . . . . .                                           | 14                   |                      |
| J5                    | 44774-0000     | . Same as J1 . . . . .                                           | 16                   |                      |
| Q1                    | 36961-4124     | . TRANSISTOR, Type 2N4124 . . . . .                              | 1                    |                      |
| Q2                    | 36961-4124     | . Same as Q1 . . . . .                                           | 1                    |                      |
| Q3                    | 36961-4124     | . Same as Q1 . . . . .                                           | 1                    |                      |
| Q4                    | 37447-3904     | . TRANSISTOR, Type 2N3904 . . . . .                              | 1                    |                      |
| R1                    | 341-0473       | . RESISTOR, Fxd, cmpsn, 47 k ohms $\pm$ 5%, 1/4 W . . . . .      | 1                    |                      |
| R2                    | 341-0473       | . Same as R1 . . . . .                                           | 1                    |                      |
| R3                    | 341-0114       | . RESISTOR, Fxd, cmpsn, 110 k ohms $\pm$ 5%, 1/4 W . . . . .     | 1                    |                      |
| R4                    | 341-0914       | . RESISTOR, Fxd, cmpsn, 910 k ohms $\pm$ 5%, 1/4 W . . . . .     | 1                    |                      |
| R5                    | 341-0273       | . RESISTOR, Fxd, cmpsn, 27 k ohms $\pm$ 5%, 1/4 W . . . . .      | 1                    |                      |
| R6                    | 341-0273       | . Same as R5 . . . . .                                           | 1                    |                      |
| R7                    | 341-0203       | . RESISTOR, Fxd, cmpsn, 20 k ohms $\pm$ 5%, 1/4 W . . . . .      | 1                    |                      |
| R8                    | 341-0203       | . Same as R7 . . . . .                                           | 1                    |                      |
| R9                    | 341-0123       | . RESISTOR, Fxd, cmpsn, 12 k ohms $\pm$ 5%, 1/4 W . . . . .      | 1                    |                      |
| R10                   | 341-0471       | . RESISTOR, Fxd, cmpsn, 470 ohms $\pm$ 5%, 1/4 W . . . . .       | 1                    |                      |
| R11                   | 341-0103       | . RESISTOR, Fxd, cmpsn, 10 k ohms $\pm$ 5%, 1/4 W . . . . .      | 1                    |                      |
| R12                   | 341-0222       | . RESISTOR, Fxd, cmpsn, 2.2 k ohms $\pm$ 5%, 1/4 W . . . . .     | 1                    |                      |
| R13                   | 341-0102       | . RESISTOR, Fxd, cmpsn, 1 k ohms $\pm$ 5%, 1/4 W . . . . .       | 1                    |                      |
| R14                   | 341-0471       | . Same as R10 . . . . .                                          | 1                    |                      |
| R15                   | 341-0203       | . Same as R7 . . . . .                                           | 1                    |                      |
| R16                   | 341-0103       | . Same as R11 . . . . .                                          | 1                    |                      |

| Figure &<br>Index No. | Part<br>Number | Description |                                                   |   |   |   |   | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|-------------|---------------------------------------------------|---|---|---|---|----------------------|----------------------|
|                       |                | 1           | 2                                                 | 3 | 4 | 5 | 6 |                      |                      |
| 7-5-R17               | 341-0203       | .           | Same as R7                                        | . | . | . | . | 1                    |                      |
| R18                   | 341-0183       | .           | RESISTOR, Fxd, cmpsn, 18 k ohms $\pm 5\%$ , 1/4 W | . | . | . | . | 1                    |                      |
| U1                    | 42537-0001     | .           | INTEGRATED CIRCUIT, Type MC1455P1                 | . | . | . | . | 1                    |                      |
| U2                    | 42537-0001     | .           | Same as U1                                        | . | . | . | . | 1                    |                      |
| U3                    | 43792-4528     | .           | INTEGRATED CIRCUIT, Type 4528                     | . | . | . | . | 1                    |                      |
| U4                    | 43792-4011     | .           | INTEGRATED CIRCUIT, Type 4011                     | . | . | . | . | 1                    |                      |
| U5                    | 43792-4011     | .           | Same as U4                                        | . | . | . | . | 1                    |                      |
| U6                    | 43792-4011     | .           | Same as U4                                        | . | . | . | . | 1                    |                      |
| U7                    | 43792-4011     | .           | Same as U4                                        | . | . | . | . | 1                    |                      |
| U8                    | 43792-4019     | .           | INTEGRATED CIRCUIT, Type 4019                     | . | . | . | . | 1                    |                      |
| U9                    | 43792-4039     | .           | INTEGRATED CIRCUIT, Type 4039                     | . | . | . | . | 1                    |                      |
| U10                   | 43792-4039     | .           | Same as U9                                        | . | . | . | . | 1                    |                      |
| U11                   | 43792-4039     | .           | Same as U9                                        | . | . | . | . | 1                    |                      |
| U12                   | 43792-4039     | .           | Same as U9                                        | . | . | . | . | 1                    |                      |
| U13                   | 43792-4050     | .           | INTEGRATED CIRCUIT, Type 4050                     | . | . | . | . | 1                    |                      |
| U14                   | 43792-4050     | .           | Same as U13                                       | . | . | . | . | 1                    |                      |
| U15                   | 43792-4050     | .           | Same as U13                                       | . | . | . | . | 1                    |                      |
| U16                   | 43792-4050     | .           | Same as U13                                       | . | . | . | . | 1                    |                      |
| U17                   | 43792-4050     | .           | Same as U13                                       | . | . | . | . | 1                    |                      |
| U18                   | 42458-7047     | .           | INTEGRATED CIRCUIT, Type SN74L47N                 | . | . | . | . | 1                    |                      |
| U19                   | 42458-7047     | .           | Same as U18                                       | . | . | . | . | 1                    |                      |
| U20                   | 42458-7047     | .           | Same as U18                                       | . | . | . | . | 1                    |                      |
| U21                   | 42458-7047     | .           | Same as U18                                       | . | . | . | . | 1                    |                      |
| U22                   | 42458-7047     | .           | Same as U18                                       | . | . | . | . | 1                    |                      |
| U23                   | 42458-7047     | .           | Same as U18                                       | . | . | . | . | 1                    |                      |
| U24                   | 42458-7047     | .           | Same as U18                                       | . | . | . | . | 1                    |                      |
| U25                   | 43792-4048     | .           | INTEGRATED CIRCUIT, Type 4048                     | . | . | . | . | 1                    |                      |
| U26                   | 43792-4042     | .           | INTEGRATED CIRCUIT, Type 4042                     | . | . | . | . | 1                    |                      |
| U27                   | 43792-4042     | .           | Same as U26                                       | . | . | . | . | 1                    |                      |
| U28                   | 43792-4042     | .           | Same as U26                                       | . | . | . | . | 1                    |                      |
| U29                   | 43792-4042     | .           | Same as U26                                       | . | . | . | . | 1                    |                      |
| U30                   | 43792-4042     | .           | Same as U26                                       | . | . | . | . | 1                    |                      |
| U31                   | 43792-4042     | .           | Same as U26                                       | . | . | . | . | 1                    |                      |
| U32                   | 43792-4042     | .           | Same as U26                                       | . | . | . | . | 1                    |                      |
| U33                   | 44849-0223     | .           | NETWORK, Resistor, Type 898-1R22K                 | . | . | . | . | 1                    |                      |
| U34                   | 44849-0223     | .           | Same as U33                                       | . | . | . | . | 1                    |                      |
| U35                   | 44849-0223     | .           | Same as U33                                       | . | . | . | . | 1                    |                      |
| -1                    | 42467-0000     | .           | FIBER, Optical                                    | . | . | . | . | AR                   |                      |
| -2                    | 44175-0000     | .           | SPACER                                            | . | . | . | . | 2                    |                      |
| -3                    | 43874-0014     | .           | SOCKET, Dual-in-line                              | . | . | . | . | 8                    |                      |
| -4                    | 44125-0000     | .           | BRACKET, Stiffener                                | . | . | . | . | 1                    |                      |
| -5                    | 102-0012       | .           | SCREW, Bdgh, brs np, 2-56 by 3/16 in lg           | . | . | . | . | 3                    |                      |
| -6                    | 44133-0050     | .           | BUS                                               | . | . | . | . | 1                    |                      |
| -7                    | 44133-0040     | .           | BUS                                               | . | . | . | . | 1                    |                      |
| -8                    | 44133-0030     | .           | BUS                                               | . | . | . | . | 1                    |                      |
| -9                    | 44133-0020     | .           | BUS                                               | . | . | . | . | 1                    |                      |
| -10                   | 44133-0010     | .           | BUS                                               | . | . | . | . | 1                    |                      |
| -11                   | 44133-0000     | .           | BUS                                               | . | . | . | . | 1                    |                      |
| -12                   | 44176-0000     | .           | TERMINAL                                          | . | . | . | . | 2                    |                      |
| -13                   | 39485-4008     | .           | POST                                              | . | . | . | . | 5                    |                      |

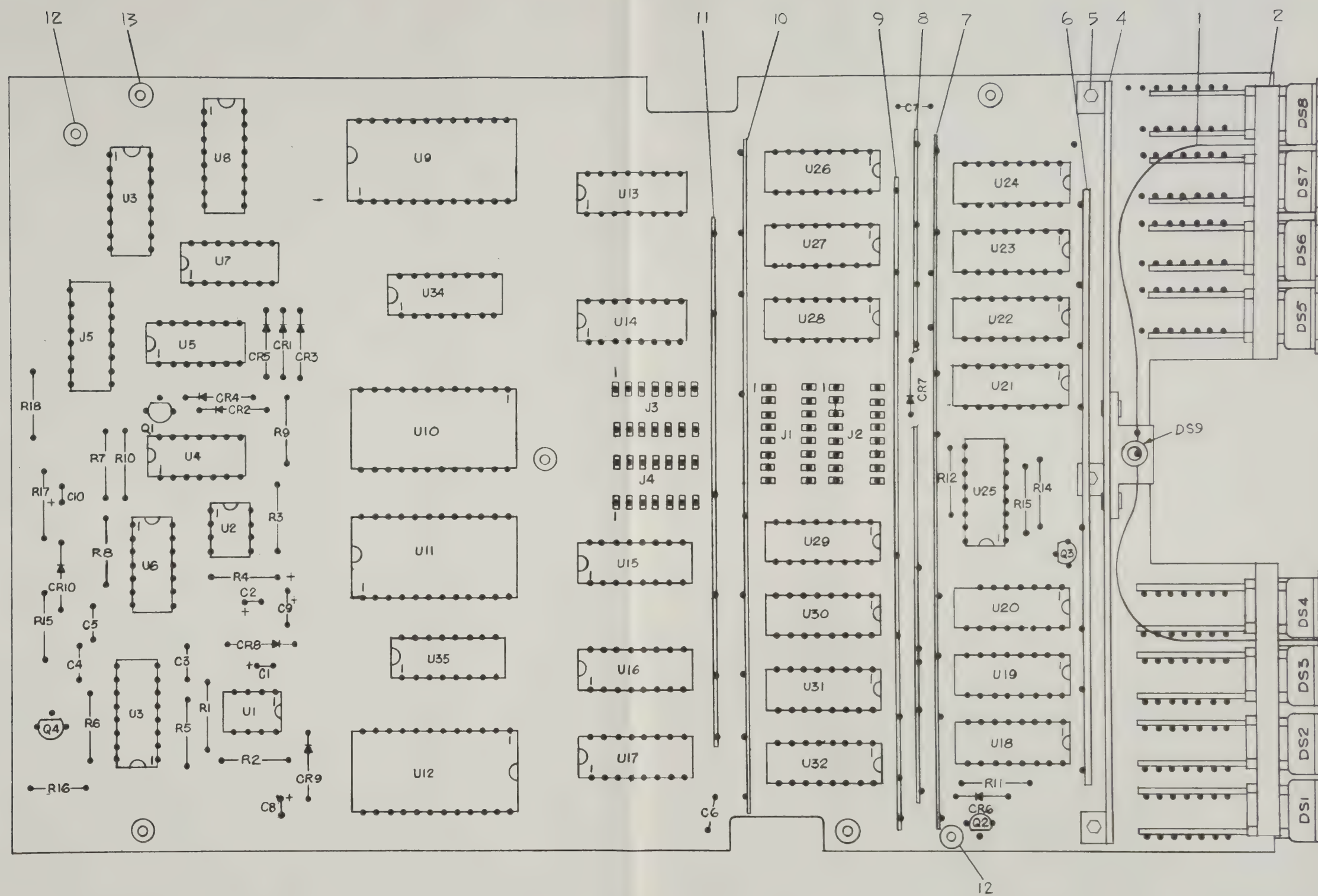


0383-1-16

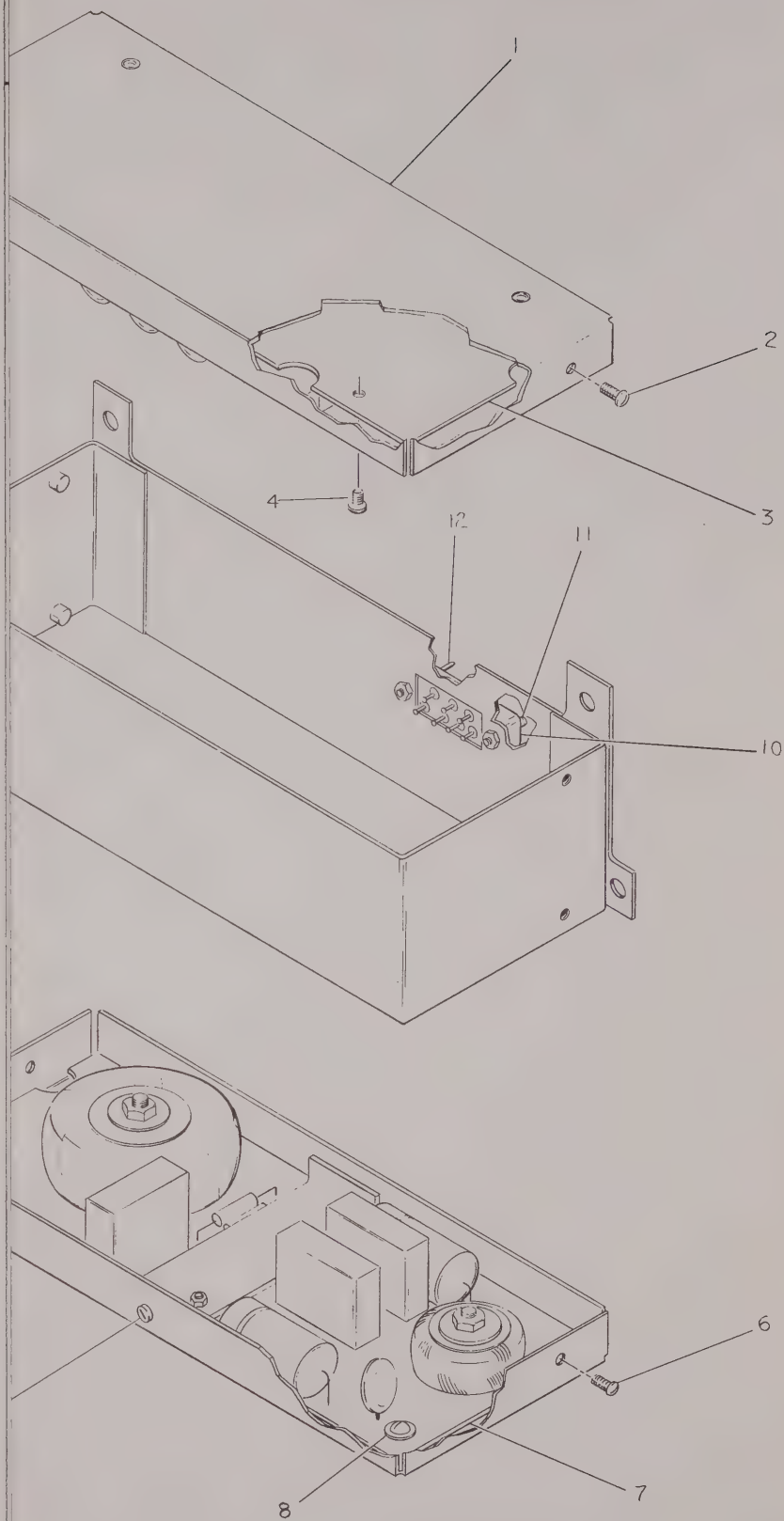
Figure 7-5. A4, Display Assembly,  
Parts Location Diagram



| Figure &<br>Index No. | Part<br>Number | Description |                                                   |   |   |   |   | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|-------------|---------------------------------------------------|---|---|---|---|----------------------|----------------------|
|                       |                | 1           | 2                                                 | 3 | 4 | 5 | 6 |                      |                      |
| 7-5-R17               | 341-0203       | .           | Same as R7                                        | . | . | . | . | 1                    |                      |
| R18                   | 341-0183       | .           | RESISTOR, Fxd, cmpsn, 18 k ohms $\pm 5\%$ , 1/4 W | . | . | . | . | 1                    |                      |
| U1                    | 42537-0001     | .           | INTEGRATED CIRCUIT, Type MC1455P1                 | . | . | . | . | 1                    |                      |
| U2                    | 42537-0001     | .           | Same as U1                                        | . | . | . | . | 1                    |                      |
| U3                    | 43792-4528     | .           | INTEGRATED CIRCUIT, Type 4528                     | . | . | . | . | 1                    |                      |
| U4                    | 43792-4011     | .           | INTEGRATED CIRCUIT, Type 4011                     | . | . | . | . | 1                    |                      |
| U5                    | 43792-4011     | .           | Same as U4                                        | . | . | . | . | 1                    |                      |
| U6                    | 43792-4011     | .           | Same as U4                                        | . | . | . | . | 1                    |                      |
| U7                    | 43792-4011     | .           | Same as U4                                        | . | . | . | . | 1                    |                      |
| U8                    | 43792-4019     | .           | INTEGRATED CIRCUIT, Type 4019                     | . | . | . | . | 1                    |                      |
| U9                    | 43792-4039     | .           | INTEGRATED CIRCUIT, Type 4039                     | . | . | . | . | 1                    |                      |
| U10                   | 43792-4039     | .           | Same as U9                                        | . | . | . | . | 1                    |                      |
| U11                   | 43792-4039     | .           | Same as U9                                        | . | . | . | . | 1                    |                      |
| U12                   | 43792-4039     | .           | Same as U9                                        | . | . | . | . | 1                    |                      |
| U13                   | 43792-4050     | .           | INTEGRATED CIRCUIT, Type 4050                     | . | . | . | . | 1                    |                      |
| U14                   | 43792-4050     | .           | Same as U13                                       | . | . | . | . | 1                    |                      |
| U15                   | 43792-4050     | .           | Same as U13                                       | . | . | . | . | 1                    |                      |
| U16                   | 43792-4050     | .           | Same as U13                                       | . | . | . | . | 1                    |                      |
| U17                   | 43792-4050     | .           | Same as U13                                       | . | . | . | . | 1                    |                      |
| U18                   | 42458-7047     | .           | INTEGRATED CIRCUIT, Type SN74L47N                 | . | . | . | . | 1                    |                      |
| U19                   | 42458-7047     | .           | Same as U18                                       | . | . | . | . | 1                    |                      |
| U20                   | 42458-7047     | .           | Same as U18                                       | . | . | . | . | 1                    |                      |
| U21                   | 42458-7047     | .           | Same as U18                                       | . | . | . | . | 1                    |                      |
| U22                   | 42458-7047     | .           | Same as U18                                       | . | . | . | . | 1                    |                      |
| U23                   | 42458-7047     | .           | Same as U18                                       | . | . | . | . | 1                    |                      |
| U24                   | 42458-7047     | .           | Same as U18                                       | . | . | . | . | 1                    |                      |
| U25                   | 43792-4048     | .           | INTEGRATED CIRCUIT, Type 4048                     | . | . | . | . | 1                    |                      |
| U26                   | 43792-4042     | .           | INTEGRATED CIRCUIT, Type 4042                     | . | . | . | . | 1                    |                      |
| U27                   | 43792-4042     | .           | Same as U26                                       | . | . | . | . | 1                    |                      |
| U28                   | 43792-4042     | .           | Same as U26                                       | . | . | . | . | 1                    |                      |
| U29                   | 43792-4042     | .           | Same as U26                                       | . | . | . | . | 1                    |                      |
| U30                   | 43792-4042     | .           | Same as U26                                       | . | . | . | . | 1                    |                      |
| U31                   | 43792-4042     | .           | Same as U26                                       | . | . | . | . | 1                    |                      |
| U32                   | 43792-4042     | .           | Same as U26                                       | . | . | . | . | 1                    |                      |
| U33                   | 44849-0223     | .           | NETWORK, Resistor, Type 898-1R22K                 | . | . | . | . | 1                    |                      |
| U34                   | 44849-0223     | .           | Same as U33                                       | . | . | . | . | 1                    |                      |
| U35                   | 44849-0223     | .           | Same as U33                                       | . | . | . | . | 1                    |                      |
| -1                    | 42467-0000     | .           | FIBER, Optical                                    | . | . | . | . | AR                   |                      |
| -2                    | 44175-0000     | .           | SPACER                                            | . | . | . | . | 2                    |                      |
| -3                    | 43874-0014     | .           | SOCKET, Dual-in-line                              | . | . | . | . | 8                    |                      |
| -4                    | 44125-0000     | .           | BRACKET, Stiffener                                | . | . | . | . | 1                    |                      |
| -5                    | 102-0012       | .           | SCREW, Bdgh, brs np, 2-56 by 3/16 in lg           | . | . | . | . | 3                    |                      |
| -6                    | 44133-0050     | .           | BUS                                               | . | . | . | . | 1                    |                      |
| -7                    | 44133-0040     | .           | BUS                                               | . | . | . | . | 1                    |                      |
| -8                    | 44133-0030     | .           | BUS                                               | . | . | . | . | 1                    |                      |
| -9                    | 44133-0020     | .           | BUS                                               | . | . | . | . | 1                    |                      |
| -10                   | 44133-0010     | .           | BUS                                               | . | . | . | . | 1                    |                      |
| -11                   | 44133-0000     | .           | BUS                                               | . | . | . | . | 1                    |                      |
| -12                   | 44176-0000     | .           | TERMINAL                                          | . | . | . | . | 2                    |                      |
| -13                   | 39485-4008     | .           | POST                                              | . | . | . | . | 5                    |                      |







0383-1-17

Figure 7-6. A6, Power Converter Assembly,  
Exploded View





| Figure &<br>Index No. | Part<br>Number | Description                                                                        | 1 2 3 4 5 6 |  |  |  |  |  | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|------------------------------------------------------------------------------------|-------------|--|--|--|--|--|----------------------|----------------------|
|                       |                |                                                                                    |             |  |  |  |  |  |                      |                      |
| 7-6-                  | 44183-0000     | POWER CONVERTER ASSEMBLY, A6 (See Fig 7-1 -23 for NHA) . . . .                     |             |  |  |  |  |  | REF                  |                      |
| -1                    | 44188-0000     | . COVER, Top . . . . .<br>(ATTACHING PARTS)                                        |             |  |  |  |  |  | 1                    |                      |
| -2                    | 112-0012       | . SCREW, Bdgh, brs blk oxd, 2-56 by 3/16 in lg . . . . .<br>* . . . .              |             |  |  |  |  |  | 4                    |                      |
| -3                    | 44195-0000     | . POWER CONVERTER SUBASSEMBLY, A6A2 (See Fig 7-7 for details)<br>(ATTACHING PARTS) |             |  |  |  |  |  | 1                    |                      |
| -4                    | 502-0012       | . SCREW, Bdgh w/lk wash, brs np, 2-56 by 3/16 in lg . . . . .<br>* . . . .         |             |  |  |  |  |  | 4                    |                      |
| -5                    | 44189-0000     | . COVER, Bottom . . . . .<br>(ATTACHING PARTS)                                     |             |  |  |  |  |  | 1                    |                      |
| -6                    | 112-0012       | . SCREW, Bdgh, brs blk oxd, 2-56 by 3/16 in lg . . . . .<br>* . . . .              |             |  |  |  |  |  | 4                    |                      |
| -7                    | 44193-0000     | . POWER CONVERTER SUBASSEMBLY, A6A1 (See Fig 7-8 for details)<br>(ATTACHING PARTS) |             |  |  |  |  |  | 1                    |                      |
| -8                    | 502-0012       | . SCREW, Bdgh w/lk wash, brs np, 2-56 by 3/16 in lg . . . . .                      |             |  |  |  |  |  | 4                    |                      |
| -9                    | 114-0016       | . SCREW, Bdgh, brs blk oxd, 4-40 by 1/4 in lg . . . . .<br>* . . . .               |             |  |  |  |  |  | 1                    |                      |
| -10                   | 38311-0007     | . CONNECTOR, Plug, A6P1 . . . . .                                                  |             |  |  |  |  |  | 1                    |                      |
| -11                   | 38312-0001     | . GUIDE . . . . .                                                                  |             |  |  |  |  |  | 1                    |                      |
| -12                   | 38312-0002     | . GUIDE . . . . .                                                                  |             |  |  |  |  |  | 1                    |                      |

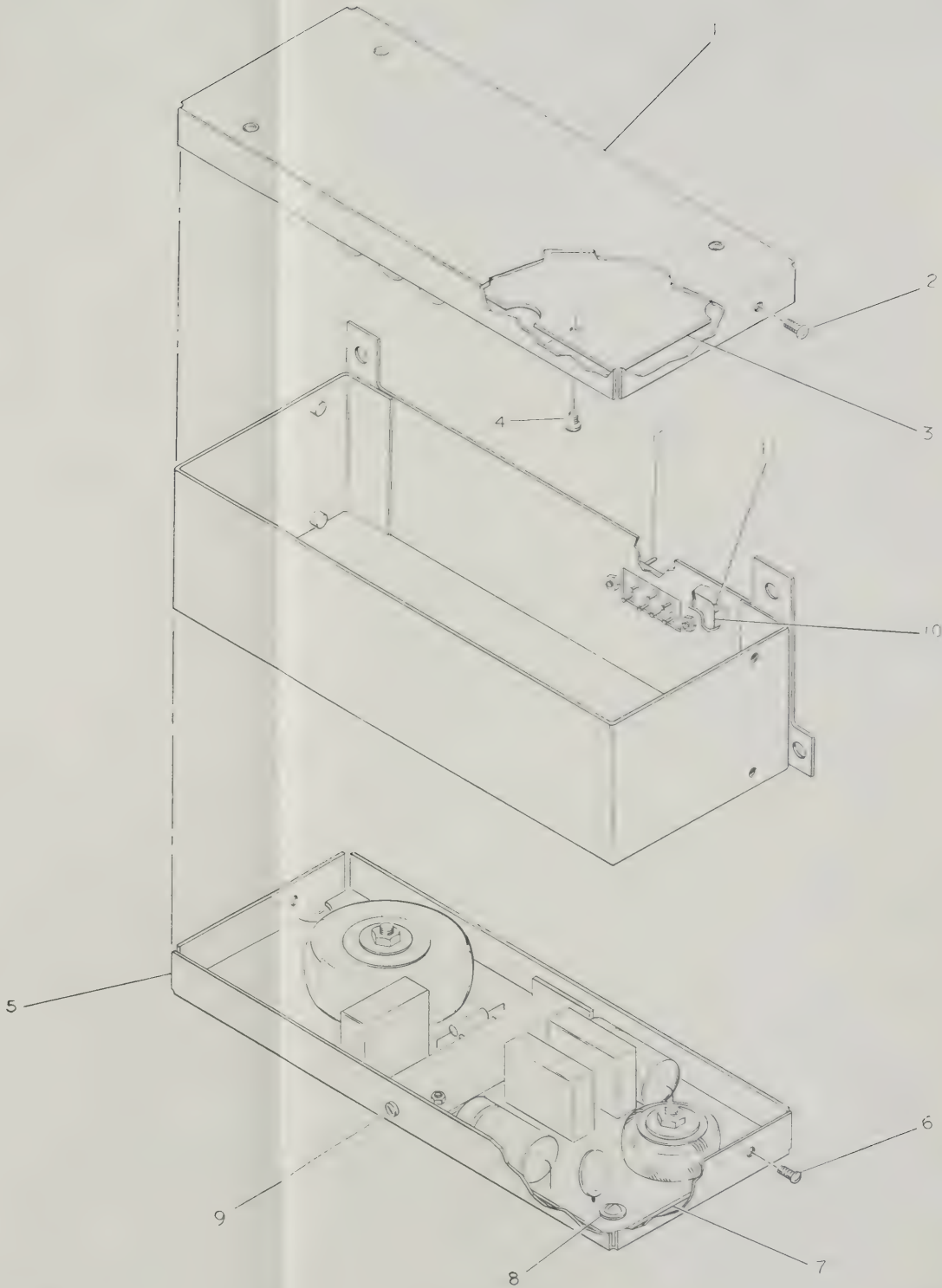
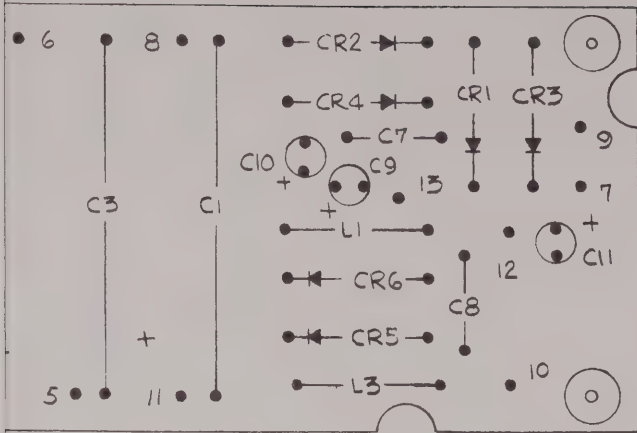


Figure 7-6. A6, Power Converter Assembly, Exploded View





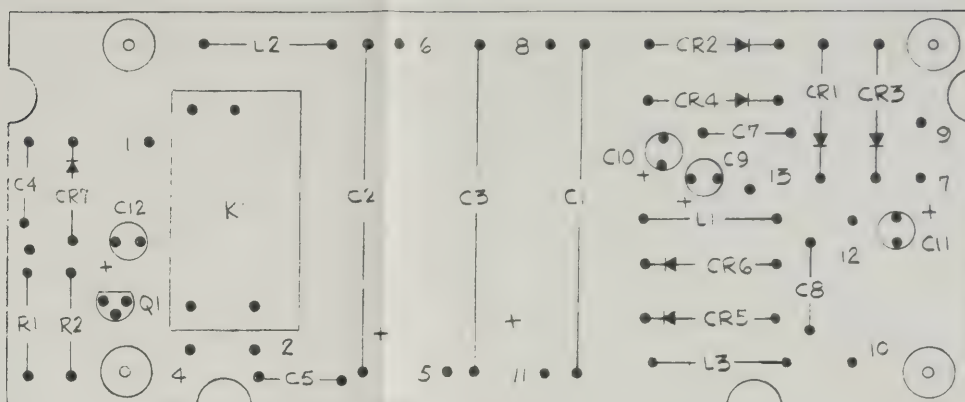
0383-1-18

Converter Subassembly, Parts Location Diagram

| Description                                          | Units<br>per<br>Assy | Usable<br>on<br>Code |
|------------------------------------------------------|----------------------|----------------------|
| CONVERTER SUBASSEMBLY, A6A2 (See Fig 7-6 -3 for NHA) | REF                  |                      |
| FOR DEVICE, Diode, Type FSCER69-5                    | 1                    |                      |
|                                                      | 1                    |                      |
|                                                      | 1                    |                      |
|                                                      | 1                    |                      |
| FOR DEVICE, Diode, Type NS2001                       | 1                    |                      |
|                                                      | 1                    |                      |
| FOR DEVICE, Diode, Type IN916                        | 1                    |                      |
| Fxd, elctlt, 220 $\mu$ F +100 -10%, 40 Vdc           | 1                    |                      |
|                                                      | 1                    |                      |
|                                                      | 1                    |                      |
| Fxd, cer, 0.1 $\mu$ F +80 -20%, 100 Vdc              | 1                    |                      |
|                                                      | 1                    |                      |
| Fxd, cer, 4700 pF $\pm$ 10%, 200 Vdc                 | 1                    |                      |
|                                                      | 1                    |                      |
| Fxd, mtic, 1 $\mu$ F $\pm$ 10%, 35 Vdc               | 1                    |                      |
|                                                      | 1                    |                      |
|                                                      | 1                    |                      |
| $\mu$ H $\pm$ 10%                                    | 1                    |                      |
|                                                      | 1                    |                      |
|                                                      | 1                    |                      |
| Type 2N3904                                          | 1                    |                      |
| d, cmpsn, 6.8 k ohms $\pm$ 5%, 1/4 W                 | 1                    |                      |
|                                                      | 1                    |                      |







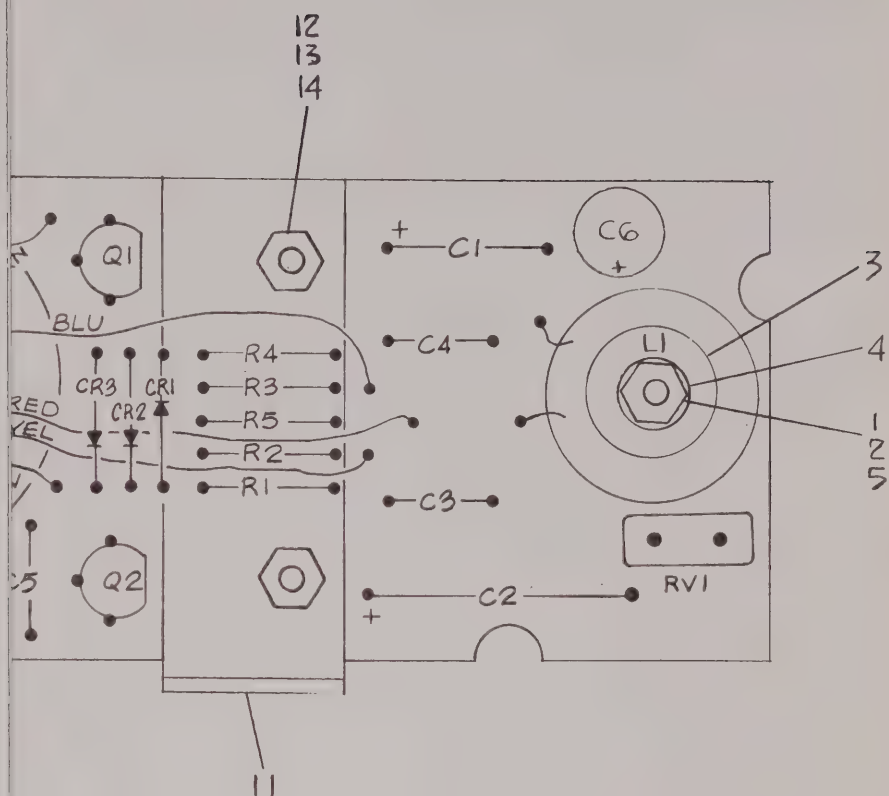
44195J

Figure 7-7. A6A2, Power Converter Subassembly, Parts Location Diagram

0383-1-18

| Figure &<br>Index No. | Part<br>Number | Description                                                |   |   |   |   |   | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|------------------------------------------------------------|---|---|---|---|---|----------------------|----------------------|
|                       |                | 1                                                          | 2 | 3 | 4 | 5 | 6 |                      |                      |
| 7-7-                  | 44195-0000     | POWER CONVERTER SUBASSEMBLY, A6A2 (See Fig 7-6 -3 for NHA) |   |   |   |   |   | REF                  |                      |
| CR1                   | 33831-0201     | SEMICONDUCTOR DEVICE, Diode, Type FSCER69-5                |   |   |   |   |   | 1                    |                      |
| CR2                   | 33831-0201     | Same as CR1                                                |   |   |   |   |   | 1                    |                      |
| CR3                   | 33831-0201     | Same as CR1                                                |   |   |   |   |   | 1                    |                      |
| CR4                   | 33831-0201     | Same as CR1                                                |   |   |   |   |   | 1                    |                      |
| CR5                   | 45531-0001     | SEMICONDUCTOR DEVICE, Diode, Type NS2001                   |   |   |   |   |   | 1                    |                      |
| CR6                   | 45531-0001     | Same as CR5                                                |   |   |   |   |   | 1                    |                      |
| CR7                   | 32433-0005     | SEMICONDUCTOR DEVICE, Diode, Type IN916                    |   |   |   |   |   | 1                    |                      |
| C1                    | 38268-4002     | CAPACITOR, Fxd, elctlt, 220 $\mu$ F +100 -10%, 40 Vdc      |   |   |   |   |   | 1                    |                      |
| C2                    | 38268-4002     | Same as C1                                                 |   |   |   |   |   | 1                    |                      |
| C3                    | 38268-4002     | Same as C1                                                 |   |   |   |   |   | 1                    |                      |
| C4                    | 31476-9102     | CAPACITOR, Fxd, cer, 0.1 $\mu$ F +80 -20%, 100 Vdc         |   |   |   |   |   | 1                    |                      |
| C5                    | 31476-9102     | Same as C4                                                 |   |   |   |   |   | 1                    |                      |
| C7                    | 30949-0472     | CAPACITOR, Fxd, cer, 4700 pF $\pm$ 10%, 200 Vdc            |   |   |   |   |   | 1                    |                      |
| C8                    | 30949-0472     | Same as C7                                                 |   |   |   |   |   | 1                    |                      |
| C9                    | 40248-1074     | CAPACITOR, Fxd, mtic, 1 $\mu$ F $\pm$ 10%, 35 Vdc          |   |   |   |   |   | 1                    |                      |
| C10                   | 40248-1074     | Same as C9                                                 |   |   |   |   |   | 1                    |                      |
| C11                   | 40248-1074     | Same as C9                                                 |   |   |   |   |   | 1                    |                      |
| K1                    | 45511-0000     | RELAY                                                      |   |   |   |   |   | 1                    |                      |
| L1                    | 34894-8221     | COIL, RF, 2.2 $\mu$ H $\pm$ 10%                            |   |   |   |   |   | 1                    |                      |
| L2                    | 34894-8221     | Same as L1                                                 |   |   |   |   |   | 1                    |                      |
| L3                    | 34894-8221     | Same as L1                                                 |   |   |   |   |   | 1                    |                      |
| Q1                    | 41123-0061     | TRANSISTOR, Type 2N3904                                    |   |   |   |   |   | 1                    |                      |
| R1                    | 341-0682       | RESISTOR, Fxd, cmpsn, 6.8 k ohms $\pm$ 5%, 1/4 W           |   |   |   |   |   | 1                    |                      |
| R2                    | 341-0682       | Same as R1                                                 |   |   |   |   |   | 1                    |                      |





0383-1-19

Figure 7-8. A6A1, Power Converter  
Subassembly, Parts Location Diagram





| Figure &<br>Index No. | Part<br>Number | Description                                                | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|------------------------------------------------------------|----------------------|----------------------|
| 7-8-                  | 44193-0000     | POWER CONVERTER SUBASSEMBLY, A6A1 (See Fig 7-6 -7 for NHA) | REF                  |                      |
| CR1                   | 32433-0005     | SEMICONDUCTOR DEVICE, Diode, Type IN916                    | 1                    |                      |
| CR2                   | 32433-0005     | Same as CR1                                                | 1                    |                      |
| CR3                   | 32433-0005     | Same as CR1                                                | 1                    |                      |
| C1                    | 42536-1682     | CAPACITOR, Fxd, plstc, 0.68 $\mu$ F $\pm$ 10%, 100 Vdc     | 1                    |                      |
| C2                    | 38269-6312     | CAPACITOR, Fxd, elctlt, 47 $\mu$ F +100 -10%, 63 Vdc       | 1                    |                      |
| C3                    | 42536-2473     | CAPACITOR, Fxd, plstc, 0.047 $\mu$ F $\pm$ 10%, 250 Vdc    | 1                    |                      |
| C4                    | 42536-2473     | Same as C3                                                 | 1                    |                      |
| C5                    | 42536-2473     | Same as C3                                                 | 1                    |                      |
| C6                    | 40248-2087     | CAPACITOR, Fxd, tant, 22 $\mu$ F $\pm$ 20%, 50 Vdc         | 1                    |                      |
| L1                    | 44282-0000     | CHOKE ASSEMBLY, Toroidal                                   | 1                    |                      |
|                       |                | (ATTACHING PARTS)                                          |                      |                      |
| -1                    | 104-0040       | SCREW, Bdgh, brs np, 4-40 by 5/8 in lg                     | 1                    |                      |
| -2                    | 44198-0000     | WASHER, Flat, No. 4                                        | 1                    |                      |
| -3                    | 44190-0000     | WASHER, Flat, epoxy glass                                  | 1                    |                      |
| -4                    | 13527-0000     | WASHER, Spring, No. 4                                      | 1                    |                      |
| -5                    | 804-0000       | NUT, Hex, 4-40                                             | 1                    |                      |
|                       |                | -----                                                      |                      |                      |
| Q1                    | 41123-0056     | TRANSISTOR, Type 2N5991                                    | 1                    |                      |
| Q2                    | 41123-0056     | Same as Q1                                                 | 1                    |                      |
| RV1                   | 45553-0003     | VARISTOR, Metal, oxide                                     | 1                    |                      |
| R1                    | 200-0100       | RESISTOR, Fxd, cmpsn, 10 ohms $\pm$ 10%, 1/4 W             | 1                    |                      |
| R2                    | 200-0221       | RESISTOR, Fxd, cmpsn, 220 ohms $\pm$ 10%, 1/4 W            | 1                    |                      |
| R3                    | 200-0221       | Same as R2                                                 | 1                    |                      |
| R4                    | 200-0100       | Same as R1                                                 | 1                    |                      |
| R5                    | 201-0332       | RESISTOR, Fxd, cmpsn, 3.3 k ohms $\pm$ 5%, 1/2 W           | 1                    |                      |
| T1                    | 43293-0001     | TRANSFORMER                                                | 1                    |                      |
|                       |                | (ATTACHING PARTS)                                          |                      |                      |
| -6                    | 104-0048       | SCREW, Bdgh, brs np, 4-40 by 3/4 in lg                     | 1                    |                      |
| -7                    | 44197-0000     | WASHER, Flat, No. 4                                        | 1                    |                      |
| -8                    | 44179-0000     | WASHER, Flat, epoxy glass                                  | 1                    |                      |
| -9                    | 13524-0000     | WASHER, Spring, No. 4                                      | 1                    |                      |
| -10                   | 804-0000       | NUT, Hex, 4-40                                             | 1                    |                      |
|                       |                | -----                                                      |                      |                      |
| -11                   | 44199-0000     | HEATSINK                                                   | 1                    |                      |
|                       |                | (ATTACHING PARTS)                                          |                      |                      |
| -12                   | 104-0028       | SCREW, Bdgh, brs np, 4-40 by 7/16 in lg                    | 2                    |                      |
| -13                   | 14680-0000     | WASHER, Spring, No. 4                                      | 2                    |                      |
| -14                   | 804-0000       | NUT, Hex, 4-40                                             | 2                    |                      |
|                       |                | -----                                                      |                      |                      |

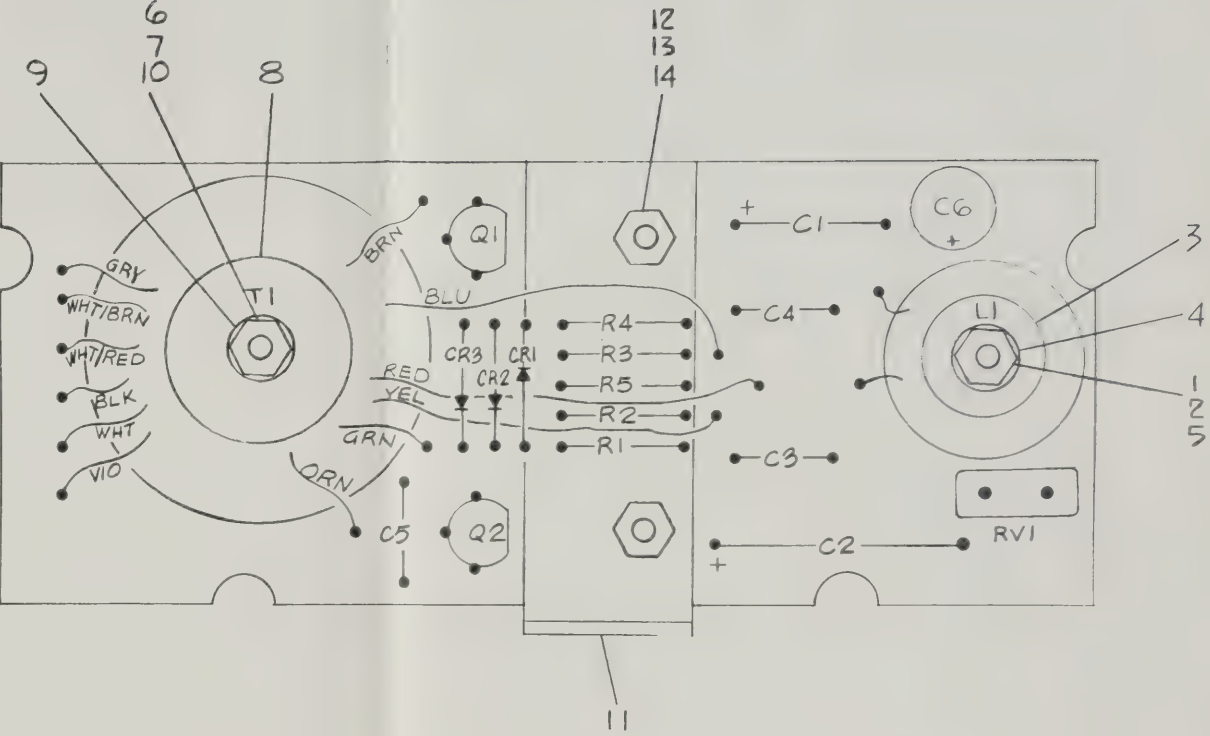
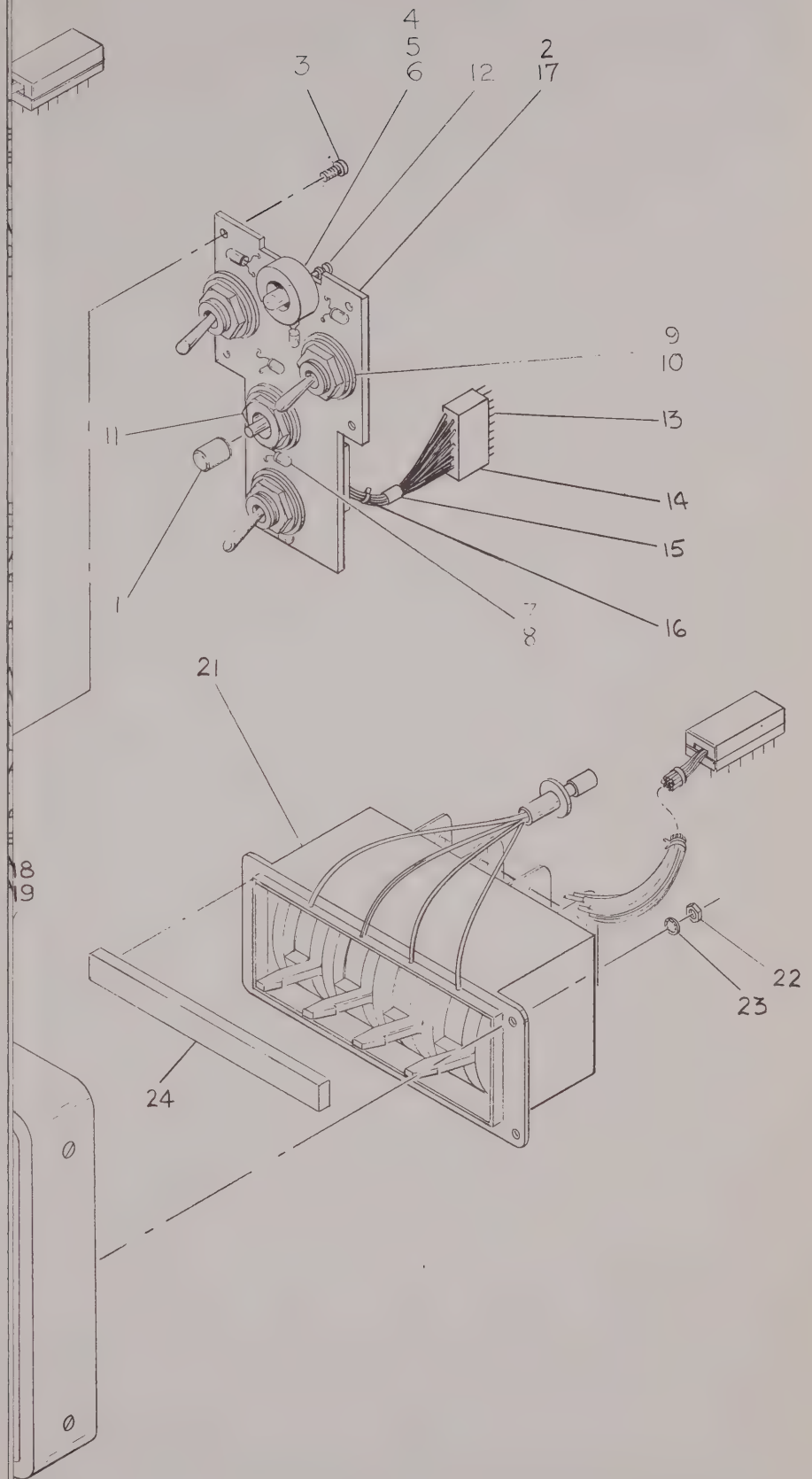


Figure 7-8. A6A1, Power Converter Subassembly, Parts Location Diagram





0383-1-21

Figure 7-9. Panel and Switch Assembly, A1,  
Exploded View





44134H  
44135G

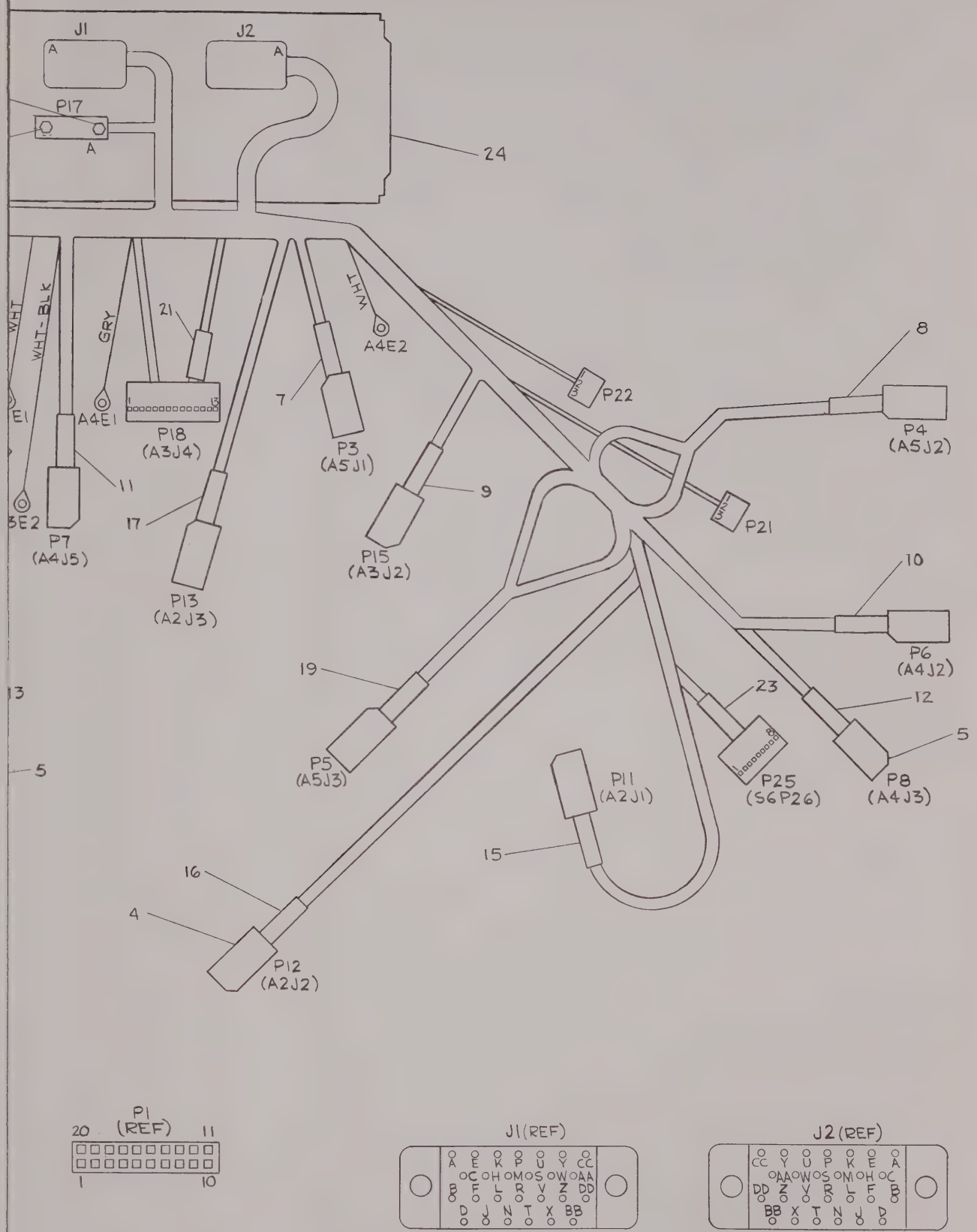




| Figure &<br>Index No. | Part<br>Number | Description                                          |   |   |   |   |   | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|------------------------------------------------------|---|---|---|---|---|----------------------|----------------------|
|                       |                | 1                                                    | 2 | 3 | 4 | 5 | 6 |                      |                      |
| 7-10-                 | 44136-0000     | HARNESS ASSEMBLY (See Fig 7-1 -31 for NHA) . . . . . |   |   |   |   |   | REF                  |                      |
| J1                    | 35860-0026     | . CONNECTOR, Elec, consisting of: . . . . .          |   |   |   |   |   | 1                    |                      |
|                       | 35861-0020     | . . CONTACT, Male . . . . .                          |   |   |   |   |   | 4                    |                      |
|                       | 35861-0024     | . . CONTACT, Male . . . . .                          |   |   |   |   |   | 21                   |                      |
|                       | 35862-0003     | . . GUIDE, Socket . . . . .                          |   |   |   |   |   | 1                    |                      |
|                       | 35862-0004     | . . GUIDE, Pin . . . . .                             |   |   |   |   |   | 1                    |                      |
| J2                    | 35860-0126     | . CONNECTOR, Elec, consisting of: . . . . .          |   |   |   |   |   | 1                    |                      |
|                       | 35861-0120     | . . CONTACT, Female . . . . .                        |   |   |   |   |   | 4                    |                      |
|                       | 35861-0114     | . . CONTACT, Female . . . . .                        |   |   |   |   |   | 2                    |                      |
|                       | 35861-0124     | . . CONTACT, Female . . . . .                        |   |   |   |   |   | 12                   |                      |
|                       | 35862-0003     | . . GUIDE, Socket . . . . .                          |   |   |   |   |   | 1                    |                      |
|                       | 35862-0004     | . . GUIDE, Pin . . . . .                             |   |   |   |   |   | 1                    |                      |
| P1                    | 42442-0020     | . CONNECTOR, Elec, consisting of: . . . . .          |   |   |   |   |   | 1                    |                      |
|                       | 42442-2217     | . . PIN, Female . . . . .                            |   |   |   |   |   | 14                   |                      |
|                       | 42442-4001     | . . PLUG, Polarizing . . . . .                       |   |   |   |   |   | 1                    |                      |
| P3                    | 44163-0116     | . CONNECTOR, Elec, plug . . . . .                    |   |   |   |   |   | 1                    |                      |
| P4                    | 44163-0116     | . CONNECTOR, Elec, plug . . . . .                    |   |   |   |   |   | 1                    |                      |
| P5                    | 44163-0116     | . CONNECTOR, Elec, plug . . . . .                    |   |   |   |   |   | 1                    |                      |
| P6                    | 44163-0116     | . CONNECTOR, Elec, plug . . . . .                    |   |   |   |   |   | 1                    |                      |
| P7                    | 44163-0116     | . CONNECTOR, Elec, plug . . . . .                    |   |   |   |   |   | 1                    |                      |
| P8                    | 44163-0114     | . CONNECTOR, Elec, plug . . . . .                    |   |   |   |   |   | 1                    |                      |
| P9                    | 44163-0014     | . CONNECTOR, Elec, plug . . . . .                    |   |   |   |   |   | 1                    |                      |
| P10                   | 44163-0116     | . CONNECTOR, Elec, plug . . . . .                    |   |   |   |   |   | 1                    |                      |
| P11                   | 44163-0116     | . CONNECTOR, Elec, plug . . . . .                    |   |   |   |   |   | 1                    |                      |
| P12                   | 44163-0116     | . CONNECTOR, Elec, plug . . . . .                    |   |   |   |   |   | 1                    |                      |
| P13                   | 44163-0116     | . CONNECTOR, Elec, plug . . . . .                    |   |   |   |   |   | 1                    |                      |
| P14                   | 44163-0116     | . CONNECTOR, Elec, plug . . . . .                    |   |   |   |   |   | 1                    |                      |
| P15                   | 44163-0116     | . CONNECTOR, Elec, plug . . . . .                    |   |   |   |   |   | 1                    |                      |
| P16                   | 44163-0116     | . CONNECTOR, Elec, plug . . . . .                    |   |   |   |   |   | 1                    |                      |
| P17                   | 38311-0007     | . CONNECTOR, Elec . . . . .                          |   |   |   |   |   | 1                    |                      |
| P18                   | 42442-5013     | . CONNECTOR, Elec, consisting of: . . . . .          |   |   |   |   |   | 1                    |                      |
|                       | 42442-2217     | . . PIN, Female . . . . .                            |   |   |   |   |   | 12                   |                      |
|                       | 42442-4001     | . . PLUG, Polarizing . . . . .                       |   |   |   |   |   | 1                    |                      |
| P19                   | 43681-0001     | . SOCKET, Transistor . . . . .                       |   |   |   |   |   | 1                    |                      |
|                       | 43681-0002     | . . CONTACT . . . . .                                |   |   |   |   |   | 3                    |                      |
| P20                   | 43057-0000     | . SOCKET, Transistor . . . . .                       |   |   |   |   |   | 1                    |                      |
| P21                   | 43681-0001     | . SOCKET, Transistor . . . . .                       |   |   |   |   |   | 1                    |                      |
|                       | 43681-0002     | . . CONTACT . . . . .                                |   |   |   |   |   | 3                    |                      |
| P22                   | 43681-0001     | . SOCKET, Transistor . . . . .                       |   |   |   |   |   | 1                    |                      |
|                       | 43681-0002     | . . CONTACT . . . . .                                |   |   |   |   |   | 3                    |                      |
| P23                   | 42442-0016     | . CONNECTOR, Elec . . . . .                          |   |   |   |   |   | 1                    |                      |
|                       | 42442-2217     | . . PIN, Female . . . . .                            |   |   |   |   |   | 13                   |                      |
|                       | 42442-4001     | . . PLUG, Polarizing . . . . .                       |   |   |   |   |   | 1                    |                      |
| P25                   | 42442-0016     | . CONNECTOR, Elec . . . . .                          |   |   |   |   |   | 1                    |                      |
|                       | 42442-2217     | . . PIN, Female . . . . .                            |   |   |   |   |   | 14                   |                      |
|                       | 42442-4001     | . . PLUG, Polarizing . . . . .                       |   |   |   |   |   | 1                    |                      |
| -1                    | 38312-0001     | . GUIDE, Socket . . . . .                            |   |   |   |   |   | 1                    |                      |
| -2                    | 38312-0002     | . GUIDE, Pin . . . . .                               |   |   |   |   |   | 1                    |                      |
| -3                    | 5216-0002      | . TERMINAL . . . . .                                 |   |   |   |   |   | 6                    |                      |
| -4                    | 44163-1076     | . COVER, Connector . . . . .                         |   |   |   |   |   | 12                   |                      |
| -5                    | 44163-1014     | . COVER, Connector . . . . .                         |   |   |   |   |   | 2                    |                      |
| -6                    | 46136-0001     | . MARKER, Identification . . . . .                   |   |   |   |   |   | 1                    |                      |
| -7                    | 46136-0003     | . MARKER, Identification . . . . .                   |   |   |   |   |   | 1                    |                      |
| -8                    | 46136-0004     | . MARKER, Identification . . . . .                   |   |   |   |   |   | 1                    |                      |
| -9                    | 46136-0005     | . MARKER, Identification . . . . .                   |   |   |   |   |   | 1                    |                      |



| Figure &<br>Index No. | Part<br>Number | Description |                        |   |   |   |   | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|-------------|------------------------|---|---|---|---|----------------------|----------------------|
|                       |                | 1           | 2                      | 3 | 4 | 5 | 6 |                      |                      |
| 7-10-10               | 46136-0006     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -11                   | 46136-0007     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -12                   | 46136-0008     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -13                   | 46136-0009     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -14                   | 46136-0010     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -15                   | 46136-0011     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -16                   | 46136-0012     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -17                   | 46136-0013     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -18                   | 46136-0014     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -19                   | 46136-0015     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -20                   | 46136-0016     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -21                   | 46136-0017     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -22                   | 46136-0018     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -23                   | 46136-0020     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -24                   | 44105-0000     | .           | PLATE, Rear            | . | . | . | . | 1                    |                      |



0383-1-22

Figure 7-10. Harness Assembly, Parts Location Diagram

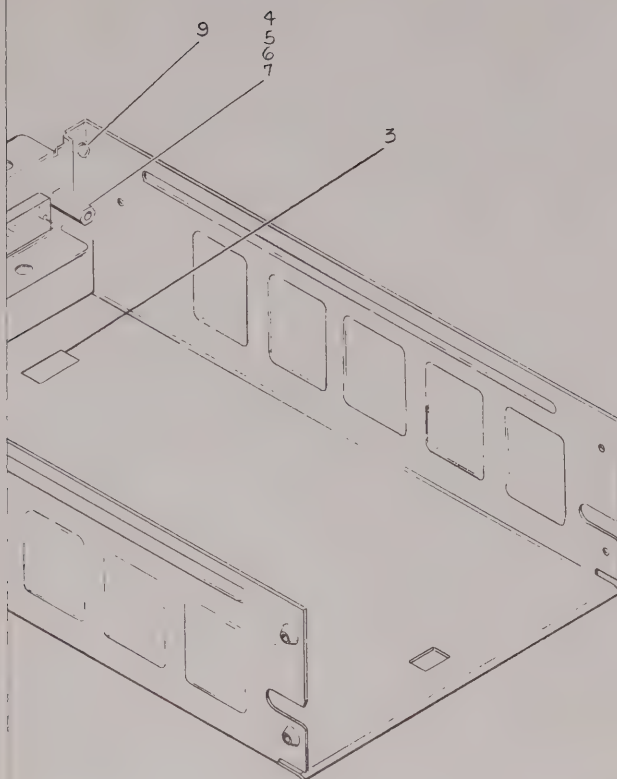
| Figure &<br>Index No. | Part<br>Number | Description |                        |   |   |   |   | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|-------------|------------------------|---|---|---|---|----------------------|----------------------|
|                       |                | 1           | 2                      | 3 | 4 | 5 | 6 |                      |                      |
| 7-10-10               | 46136-0006     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -11                   | 46136-0007     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -12                   | 46136-0008     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -13                   | 46136-0009     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -14                   | 46136-0010     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -15                   | 46136-0011     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -16                   | 46136-0012     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -17                   | 46136-0013     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -18                   | 46136-0014     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -19                   | 46136-0015     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -20                   | 46136-0016     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -21                   | 46136-0017     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -22                   | 46136-0018     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -23                   | 46136-0020     | .           | MARKER, Identification | . | . | . | . | 1                    |                      |
| -24                   | 44105-0000     | .           | PLATE, Rear            | . | . | . | . | 1                    |                      |



7-37/7-38





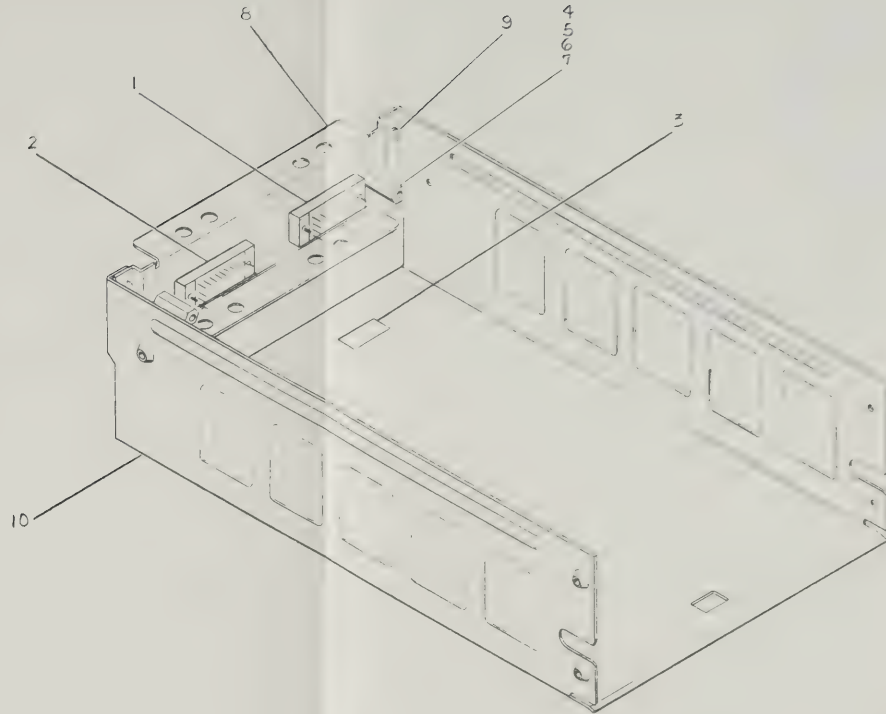


0383-1-36

Mounting Assembly, Parts Location Diagram

| Description                                      | Units<br>per<br>Assy | Usable<br>on<br>Code |
|--------------------------------------------------|----------------------|----------------------|
| SEMBLY . . . . .                                 | 1                    |                      |
| P7, (P/O Connector Kit P/N 44104-0000) . . . . . | REF                  |                      |
| P8, (P/O Connector Kit P/N 44104-0000) . . . . . | REF                  |                      |
| . . . . .                                        | 1                    |                      |
| . . . . .                                        | 2                    |                      |
| (PARTS)                                          |                      |                      |
| - 32 . . . . .                                   | 2                    |                      |
| k, No. 1/4 . . . . .                             | 2                    |                      |
| , No. 1/4 . . . . .                              | 2                    |                      |
| ar . . . . .                                     | 1                    |                      |
| (PARTS)                                          |                      |                      |
| w/lk wash, brs np, 4-40 by 3/16 in lg . . . . .  | 4                    |                      |
| SEMBLY . . . . .                                 | 1                    |                      |





44091F

0383-1-36

Figure 7-11. Mounting Assembly, Parts Location Diagram

| Figure &<br>Index No. | Part<br>Number | Description                                                   |   |   |   |   |   | Units<br>per<br>Assy | Usable<br>on<br>Code |
|-----------------------|----------------|---------------------------------------------------------------|---|---|---|---|---|----------------------|----------------------|
|                       |                | 1                                                             | 2 | 3 | 4 | 5 | 6 |                      |                      |
| 7-11-                 | 44091-0000     | MOUNTING ASSEMBLY . . . . .                                   |   |   |   |   |   | 1                    |                      |
| -1                    | 38423-0055     | . CONNECTOR, P7, (P/O Connector Kit P/N 44104-0000) . . . . . |   |   |   |   |   | REF                  |                      |
| -2                    | 38423-0059     | . CONNECTOR, P8, (P/O Connector Kit P/N 44104-0000) . . . . . |   |   |   |   |   | REF                  |                      |
| -3                    | 44092-0001     | . NAMEPLATE . . . . .                                         |   |   |   |   |   | 1                    |                      |
| -4                    | 40837-0000     | . POST, Hex . . . . .                                         |   |   |   |   |   | 2                    |                      |
|                       |                | (ATTACHING PARTS)                                             |   |   |   |   |   |                      |                      |
| -5                    | 16802-0000     | . NUT, Hex, 1/4 - 32 . . . . .                                |   |   |   |   |   | 2                    |                      |
| -6                    | 8661-0000      | . WASHER, Lock, No. 1/4 . . . . .                             |   |   |   |   |   | 2                    |                      |
| -7                    | 10643-0000     | . WASHER, Flat, No. 1/4 . . . . .                             |   |   |   |   |   | 2                    |                      |
|                       |                | . . . . .                                                     |   |   |   |   |   |                      |                      |
| -8                    | 44124-0000     | . BRACKET, Rear . . . . .                                     |   |   |   |   |   | 1                    |                      |
|                       |                | (ATTACHING PARTS)                                             |   |   |   |   |   |                      |                      |
| -9                    | 504-0012       | . SCREW, Bdgh w/lk wash, brs np, 4-40 by 3/16 in lg . . . . . |   |   |   |   |   | 4                    |                      |
|                       |                | . . . . .                                                     |   |   |   |   |   |                      |                      |
| -10                   | 44123-0000     | . BRACKET ASSEMBLY . . . . .                                  |   |   |   |   |   | 1                    |                      |



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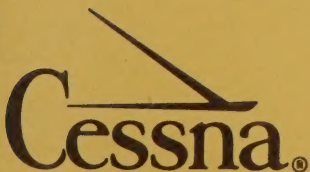
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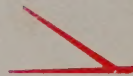
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